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COMPUTERWORLD

Users greet Timeplex sale with relief

BY JOANIE M. WEXLER
CW STAFF

In the wake of Unisys Corp.'s sale of networking subsidiary Timeplex, Inc. last week, several corporate Timeplex customers expressed quiet relief that their vendor is shedding the onus of its financially unstable parent.

Corporate customers and industry analysts said the deep pockets and ambitious business goals of Timeplex's two buyers — $2 billion operating parent Ascom Holding AG in Switzerland and $157 million Mercedes Information Technologies, Inc. in South Africa — could ensure continued research and development dollars and accelerate products to market.

"Frankly, I'm glad to see this acquisition," said Jess Reed, assistant vice president of telecommunications at Geico Corp., an insurance firm in Washington, D.C. "My feeling is that for some time, Unisys has diluted

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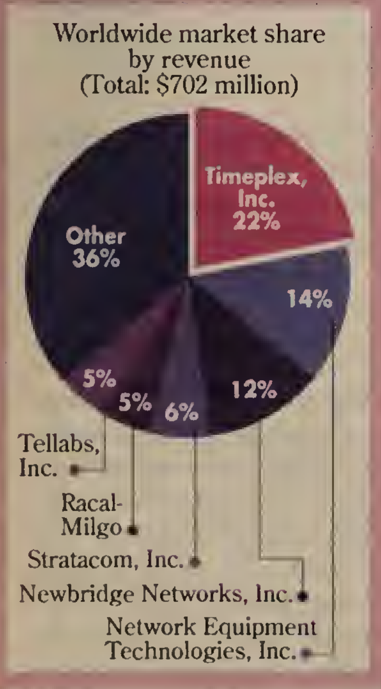
Top dog

Timeplex, Inc. led the T1 multiplexer market share in 1990



Source: Vertical Systems Group

Technology heroes honored

Ed Bradley of *60 Minutes* *presents a Computerworld Smithsonian Award to Paul Kaiser of The Lab School of Washington for his work helping disabled students. See pages 89-91.*

Open up — this is the software police!

BY MICHAEL FITZGERALD
CW STAFF

One day last March, Snap-on Tools Corp. Chairman Marion Gregory completed an afternoon meeting and walked into the lobby of the firm's headquarters.

Gregory stopped dead in his tracks at the sight of three armed federal marshals and four other somber-looking men appeared ready to do battle with drug lords.

The stunned Gregory asked Snap-on's internal legal counsel who the visitors were.

"The Software Publishers Association," the counsel said.

The experience following was painful for Snap-on as the SPA conducted a full-scale audit of Snap-on's personal computers, looking for pirated software.

RAID!

"It was a pretty grim couple of days," said a Snap-on spokesman, who related the Gregory story. During a 2½-week period, Snap-on's internal auditors joined its microcomputer managers and other departments to dig out purchase orders, invoices and manuals that proved Snap-on had paid for all of its software.

Ultimately, the SPA recanted its charge against the Fortune 500 company. But many of the approximately 70 companies that have been raided by the SPA end up paying thousands of dollars in fines.

Users who have been through an SPA raid say the experience is alarming. Representatives

Continued on page 92

Cheers, caution as DOS upgrade hits the street

Users like features but plot measured migration

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Microsoft Corp.'s MS-DOS 5.0 is expected to trigger the largest upgrade in the history of desktop software. However, initial reactions from users indicate that migration among the estimated 60 million DOS users will probably be at the low end of the 10% to 50% rate that many in the personal computer community are predicting by year's end.

For the most part, the lag is no reflection on the features of DOS 5.0, which shipped last week. Nor does it seem related to price or availability. DOS 5.0 upgrade packs are available from IBM, Microsoft and 7,000 resellers. Pricing as low as $30 per unit has been combined with corporate upgrade programs to encourage large-scale upgrades to the new operating system.

The aggressive promotions have apparently succeeded in making DOS 5.0 the standard for new system purchases almost overnight. But upgrades are another story.

Corporate decision makers are expressing caution after running into earlier problems with

Continued on page 93

TAKE 5

▶ Microsoft smoothes upgrade path, but there are still a few gotchas; IBM's aggressive PS/2 pricing pleases users. Page 93.

Apple notebook crowd forms

Buyers ready to give totable Mac another chance

BY JAMES DALY
CW STAFF

Apple Computer, Inc. is preparing to dive-bomb the portable personal computer market this fall, dropping a trio of notebook-size Macintosh computers into a target area where it has so far only landed a dud.

PC zealots who have lugged the clunky 16-pound Macintosh Portable around for the past two years said they are anxious to gobble up the lightweight Macintoshes, if early indications about their feature set prove to be true.

The new entries include a low-end model built by Sony Corp., which uses the 16-MHz Motorola, Inc. 68000 microprocessor and weighs about five pounds, sources familiar with the machines said. A midrange and high-end edition based on the 16- and 25-MHz Motorola 68030 processor, respectively, will each weigh about seven pounds. "I've been waiting for a Mac portable that doesn't break my arm," said Diana Hunt, a PC trainer in the data processing division at the Employment Development Department in Sacramento, Calif.

Apple customers said they also hoped for a machine within the price range of the

Continued on page 6

Wall St. score for RS/6000

BY MARYFRAN JOHNSON
CW STAFF

NEW YORK — In a $65 million, worldwide revamp of its branch office network, Prudential Securities, Inc. is moving from a proprietary minicomputer-based platform to open systems. By 1993, the Wall Street brokerage firm will deploy 460 IBM RISC System/6000s as servers for up to 10,000 Personal System/2 workstations.

Prudential Securities Chief Information Officer William Anderson is counting on annual savings of $7 million through 1998, plus a tenfold improvement in systems reliability. The platform is intended to give financial advisers at the 400 worldwide branches faster and better access to the corporate data center in New York.

The initial rollout begins this fall with 80 to 90 RS/6000s installed in the U.S. and abroad, replacing Unisys Corp. minicomputers. In 1993, Prudential Securities plans to begin replacing

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INSIDE

Apple and IBM appear close to striking a deal for a technology exchange involving RISC chips and operating systems. Page 92.

A grand plan is in place at the IRS, and better communications with the taxpayer may emerge. Page 8.

Executive Report — More and more IS shops evolve into a hybrid structure. Page 57.

NEWSPAPER

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4 Development directors at U.S. firms have the vision for business and user partnerships — but not the wherewithal.

6 **Cognos** opens **Windows** of opportunity with its Powerhouse 4GL and a blueprint for porting Powerhouse applications to a client/server architecture.

8 With one hand preparing to shell out a reported $190 million to the Pentagon, **Unisys** holds out its other hand for $207 million in exchange for **Timeplex**.

12 Surprising only for its speed was the announcement from **NCR** and **AT&T**'s Computer Systems Division as to which products will rise and which will fall.

13 **Cabletron** and **Silicon Graphics** are concocting a recipe for tighter network control by crossbreeding their promising network management systems.

16 Rather than look a gift computer in the mouth, users of relic systems are intrigued by **IBM**'s trade-in offer crediting competitors' machines toward new PS/2s.

93 IBM's quartet of newly announced **PS/2s** is priced to be music to users' ears.

Quotable

> *"While [Unisys'] ownership of Timeplex has not had much tangible impact on us, its presence has given us a lot of explaining to do to executive management at product acquisition time."*
>
> MICHAEL ACKERMANN
> BLUE CROSS/BLUE SHIELD
> OF MICHIGAN
>
> *Expressing relief at sale of Timeplex. See story page 1.*

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The 5th Wave

IT'S NOT THAT IT DOESN'T WORK AS A COMPUTER. IT JUST WORKS BETTER AS A PAPERWEIGHT.

EXECUTIVE BRIEFING

■ **Prudential Securities will replace Unisys minicomputers with a RISC server/PC architecture** during the next two years. The Wall Street brokerage firm hopes to realize productivity gains with IBM's Unix-based RS/6000 and as many as 10,000 PS/2s and terminals. CIO William Anderson says the increase in power is 'like going from a PC to a mainframe.' **Page 1.**

■ **Hybrid IS organizations** that combine the strengths of centralization and decentralization are becoming a popular choice for many large firms. Data center operations are being consolidated, while applications development teams are placed in specific business units. Each firm must find its own balance, as exemplified by the approaches taken by *Computerworld Premier 100* industry leaders Paine Webber, 3M and FMC. **Page 57.**

■ **Systems development directors remain frustrated** by aging Cobol portfolios and obsolete skill sets in their departments, according to a survey by CSC Index's Summit group. **Page 4.**

■ **Hyatt Hotels' successful downsizing strategy** results in a promotion to senior vice president for IS chief Gordon Kerr. The IBM AS/400-based system saves an estimated 20% over the former mainframe and allows faster market response by travel agents and Hyatt reservations agents. **Page 10.**

■ **Corporations raided by the Software Publishers Association** for using allegedly pirated programs say it can be a grim experience. However, some applaud the SPA's efforts for helping them clean their own houses. **Page 1.**

■ **High tech's human touch is the theme** as computer innovators from all fields of endeavor are honored at the third annual *Computerworld Smithsonian Awards* in Washington, D.C. **Pages 89-91.**

■ **Unisys sells off Timeplex** for $207 million and may be close to settling its Pentagon fraud case. Timeplex customers are relieved that the networking vendor is out from under 'a dark cloud.' **Pages 1 and 8.**

■ **Veteran IS executives** Anthony Vallario of Bergen Brunswig and DuWayne Peterson of Merrill Lynch are both retiring this month. Each helped establish a model of success and partnership. **Pages 53 and 54.**

■ **Apple will lose weight this fall** in the form of three notebook Macintoshes, one reportedly weighing as little as 5 pounds. Potential customers hail the improvement over the current 16-pound Macintosh portable, while Apple will try to make up for lost ground in the red-hot portables market. **Page 1.**

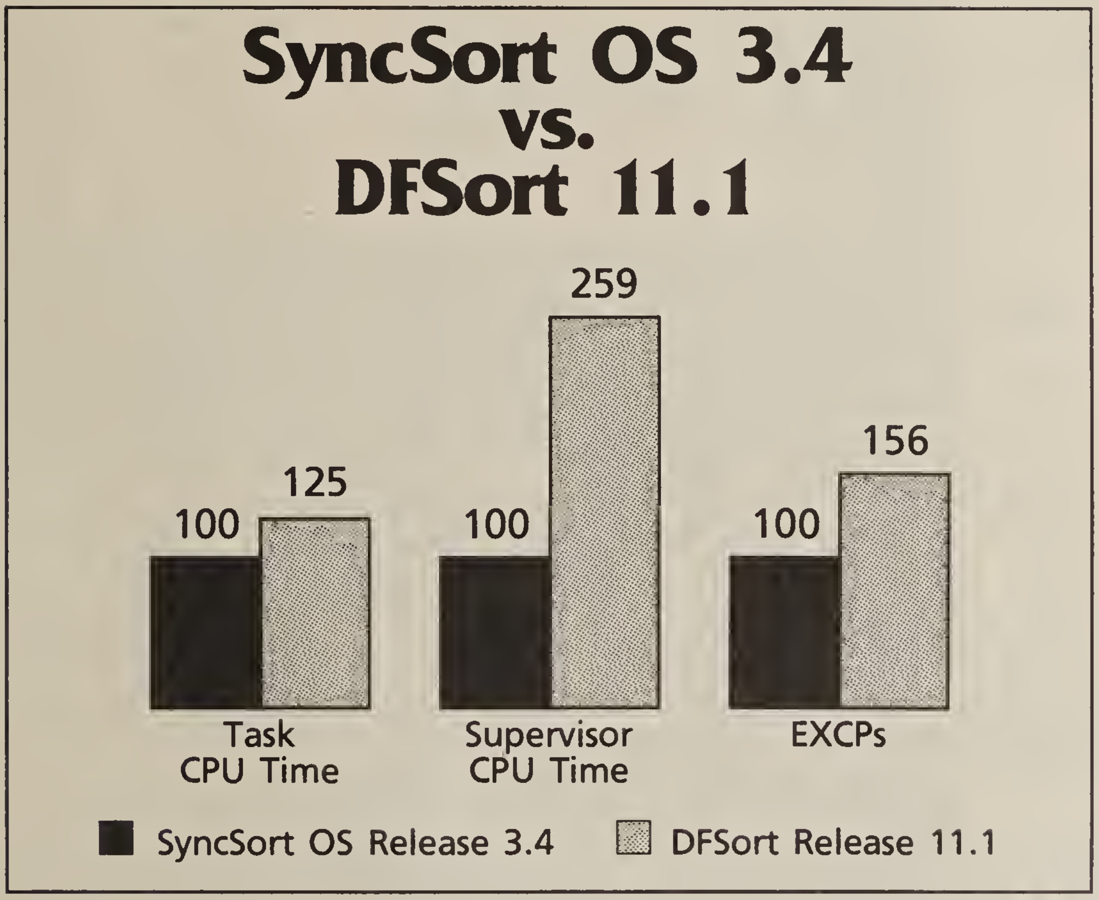
■ **Turbulent change in computer law** is expected over the next ten years. Advances in networking and data sharing and increases in vendor alliances are putting pressure on lawyers and users to shape the industry's legal future. **Page 65.**

■ **Rotating jobs and responsibilities** has several advantages, IS professionals say. Rotation gives a broader perspective of the business, improved interpersonal skills, more technical proficiency and better interdepartmental communication. **Page 76.**

■ **C programmers who write applications for Unix** find themselves at the head of the job-hunting class as Unix gains popularity in the commercial sector. **Page 77.**

■ **On-site this week:** How do you handle a hungry database? Dialog Information Services in Palo Alto, Calif., depends on increasingly denser disk drive technology to store its more than 1T byte of on-line information. **Page 29.** Imaging technology is helping General Development, a Miami-based construction firm, out of bankruptcy. Optical disc systems are cutting the cost of processing thousands of claims by the firm's creditors. **Page 41.**

THE BEST KEEPS GETTING BETTER.



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Systems development stalled

Survey respondents find frustration with old code, obsolete skills

BY CLINTON WILDER
CW STAFF

CAMBRIDGE, Mass. — Systems development directors are frustrated by an aging Cobol applications base and the increasingly obsolete skill sets of veteran programmers, according to a survey released last week. Yet computer-aided software engineering (CASE) may not present any magic-bullet cure.

The second annual survey, conducted by the Summit research service of consulting firm CSC Index, Inc., polled 142 development directors in U.S. firms with average revenue of $4.1 billion. Although 98% said development must be oriented toward business and user partnerships, the research revealed major obstacles to translating that vision into reality.

For example, only 23% of the directors said they have effective programs for training systems analysts in business problem-solving. Nearly 75% said retraining personnel to use new methods is a major challenge.

"Systems development is one of the most conservative disciplines you'll ever see," said Nicholas Vitalari, a CSC Index vice president and director of Summit. "Almost every director I've talked to is trying to find a way out of old applications, skill sets and maintenance demands. There are ways out, but none of them are cheap, and none of them are easy."

The survey offered further evidence of the end of the honeymoon with CASE tools. Only about 25% of the respondents have implemented CASE tools, and less than 5% use reverse-engineering, simulation or object-oriented methodologies. A more encouraging 38% said they use reusable code modules, but Index acknowledged that "reusable code" could encompass a wide range of methods.

CASE is "an expensive technology," Vitalari said. "In today's economy, development directors are gun-shy about investing large amounts that may not get results. In order to get results with CASE, you must reorganize the whole function."

Reflecting the budgetary effects of the recession, "increasing developer productivity" jumped to the top of the issues ranking. Last year's No. 1 issue, "developing an information architecture," dropped to fourth. "Dealing with maintenance, systems obsolescence and migration to new systems" moved up from No. 8 to No. 5, reflecting the nature of the sites surveyed.

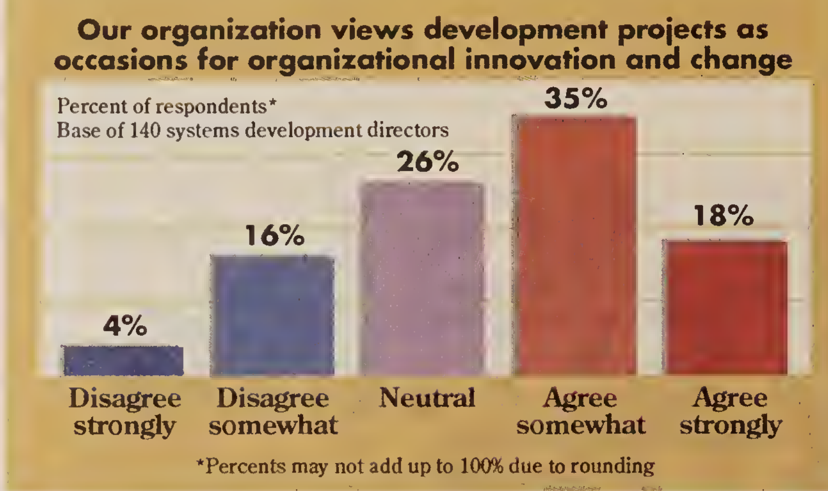
The average site profile in the survey had a 7-year-old applications portfolio, with the oldest application developed in 1973. Cobol applications accounted for an average of 74% of the portfolio, and maintenance ate up 38% of the applications budget of $31.8 million.

"Most of the people doing the maintenance have the skill sets that are becoming obsolete, and they lack business orientation or passion," Vitalari said. It becomes a catch-22 situation when senior business executives perceive development as a back-office, technically oriented function — making it even harder for the development director to get budget approval for the training and tools needed.

"Too many departments can't explain what's going on in the glass house in a language that the business can understand," Vitalari said. "When that happens, all the other corporate functions that can explain themselves in business terms win out, and IS loses."

Opportunity knocks

A majority of surveyed managers see new systems as providing a chance for broader change



Source: CSC Index, Inc. CW Chart: Doreen St. John

Getting more for the money

Improving staff productivity hurtled past developing an information architecture to become the leading concern in systems development

1991	TOP 10 SYSTEMS DEVELOPMENT ISSUES	1990
①	Increasing developer productivity	⑤
②	Developing strategic information systems	③
③	Rapidly responding to systems requests	④
④	Developing an information architecture	①
⑤	Dealing with maintenance, obsolescence and migration	⑧
⑥	Supporting cross-functional systems	②
⑦	Instituting total quality management	NR*
⑧	Showing development value to senior executives	⑪
⑨	Implementing CASE tools	⑭
⑩	Managing end-user systems development	⑲

* No rating

Source: CSC Index, Inc.

Wang denies layoff rumors, awaits results of fiscal Q4

BY SALLY CUSACK
CW STAFF

LOWELL, Mass. — An atmosphere of uneasy anticipation settled around Wang Laboratories, Inc. last week as reports of pending employee layoffs surfaced.

Wang has already reduced its work force by approximately one-third, down from 28,000 employees in 1990 to less than 18,000 in March.

However, Wang President and Chief Executive Officer Richard Miller said last week that the company has no plans now for either employee cutbacks or selling off portions of the business.

Miller said the company is waiting to evaluate the results of the fiscal fourth quarter, which ends June 30, before embarking on any major business changes.

"There is no plan at this point; we don't want to overreact or underreact," Miller said.

Wang posted a net loss of $48.9 million for the fiscal third quarter on March 31 this year, compared with a net loss of $146.6 million for the corresponding quarter in 1990.

Matthew J. Gillman, president of the U.S. Society of Wang Users, said rumors of a company takeover have been creating some concern among the user group's members, most of whom have adopted a wait-and-see attitude toward Wang's financials.

Wang's next segment of Office 2000 product introductions had been scheduled for this week. Miller said the announcements have been delayed because the company does not want to "distract any key people and disrupt the busiest financial quarter of the year."

Low-cost color printer debuts

BY CAROL HILDEBRAND
CW STAFF

New printing technology from Tektronix, Inc. could pave the way for color to hit the desktop without hitting up users for a big chunk of cash.

The Wilsonville, Ore.-based company is slated to announce today the Phaserjet PXI, a color printer that accepts nearly any type of paper in a variety of sizes ranging up to 12 by 18 inches.

The printer differs from other ink-jet printers in that it does not require special coated paper to produce high-quality, 300 dot/in. color prints.

Priced at $9,995, it is approximately one-third the price of existing color laser printers offering the same resolution, according to Tektronix spokesman A. J. Rogers, strategic marketing manager at the company's printing and imaging division.

Rogers said the company uses solid wax-based inks that melt and then resolidify upon hitting the paper's surface, preventing the absorption that costs other ink-jet printers their color quality. It is used in conjunction with a proprietary fusing process that improves ink adhesion.

The printer produces color pages at the slow rate of one page every two minutes and is aimed at the high-end graphic arts market.

The technology should trickle down to the office environment within one year, analysts said.

"A machine that sits on the desktop needs to be faster and less expensive," said Dan Miller, a senior industry analyst at Dataquest, Inc. "But the fact that it prints on plain office paper is really important in an office environment."

The Phaserjet, slated to be available in July, also supports Adobe Systems, Inc.'s PostScript Level 2. Most important Level 2 enhancements are color-related.

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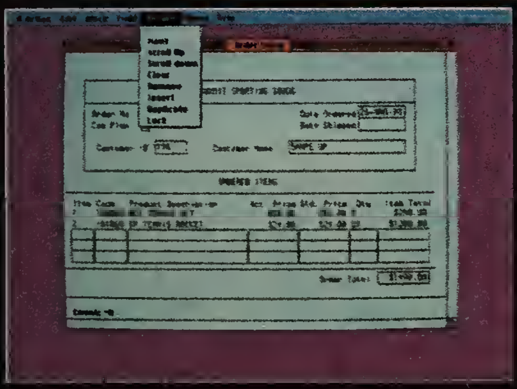

MACINTOSH

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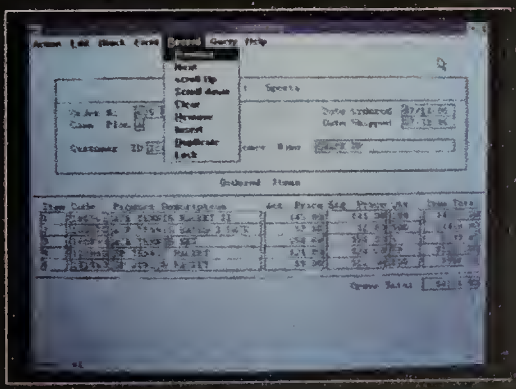

PRESENTATION MANAGER

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NEWS SHORTS

Pooled efforts on Wall Street

Securities firms are finding out that mother's advice about sharing can also work to a company's economic advantage. One industrywide initiative may help companies that choose to standardize on common telecommunications equipment. The project, called the Securities Industry Network, calls for companies to standardize on modems, line types and other telecommunications gear. If it comes to fruition during the next few months, it will "save time and money, strengthen network management, increase standardization and security and also enhance reliability," said John Compitello, chairman of the Securities Industry Association (SIA). He outlined the project at an SIA-sponsored conference held last week in New York.

……………

Face-lift for RS-232

The venerable RS-232 interface standard for computer cable connections, which dates back to May 1960, has been updated to include a small alternative connector for use on notebook computers and other small devices, according to the Telecommunications Industry Association in Washington, D.C. The new 232-E standard specifies an extremely small "26-pole connector" that is not much bigger than a telephone plug.

……………

New Carbon Copy released

Norwood, Mass.-based Microcom, Inc. said it is shipping Carbon Copy Plus Version 6.0. The new version allows systems administrators to manipulate personal computers over a local-area network for the first time. Previously, a company spokesman said, doing remote diagnostic work or file access required dialing up each machine equipped with a modem. The new version will access any operating machine on a Novell, Inc. Netware or IBM Netbios network after connecting with one networked PC with a modem. Carbon Copy Plus costs $199.

……………

HP, NCR join forces

Hewlett-Packard Co. announced last week that it will work with NCR Corp. on a plan to develop technologies to manage distributed computer systems and networks. The two firms said they found complementary ideas in separate proposals they submitted to the Open Software Foundation (OSF). The OSF called for plans for new products supporting its Distributed Management Environment standard. HP endorsed Object Manager, NCR's plan for managing Unix- or DOS-based machines, and NCR said it stands behind Management Framework, which HP and IBM submitted jointly. The relationship between HP and NCR does not preclude cooperation between either firm and other submitters nor does it restrict the OSF from choosing its own combination of technology offerings.

……………

Cincom, Fujitsu tighten ties

Cincom Systems, Inc. said it has extended its relationship with Fujitsu Ltd. to include a joint marketing and development arrangement with the Japanese company's subsidiary, Fujitsu Canada. The two companies will team up to sell Fujitsu systems and Cincom database products to Canadian customers. They will also work together to port the Cincom products to the Fujitsu Unix platform. Cincom has worked with Fujitsu since 1988 and has similar arrangements with the company in Japan and Australia, a company spokesman said.

……………

Framework gets boost

Ashton-Tate Corp. has beefed up the database size and expanded the graphics capabilities in its latest release of Framework, a suite of seven business applications united under a single menu system. Framework IV includes a new database management system that uses disk-based .DBF files — the file format used by Dbase — enabling users to build larger databases, the company said. In addition, the update now accesses Dbase files in both single and multiuser environments. On the graphics side, Framework IV now supports up to 60 internal and cartridge fonts per document. Framework IV has a suggested retail price of $695.

More news shorts on page 92

Novell announces Netware for SAA

BY JIM NASH
CW STAFF

PROVO, Utah — Novell, Inc. said last week it is shipping Netware for Systems Application Architecture (SAA) Version 1.0 and offered a peek at the network-to-mainframe communications product's next iteration, due in August.

Originally scheduled for shipment last month, Netware for SAA is a software module that provides up to 64 concurrent IBM mainframe or Application System/400 sessions over Token Ring or synchronous data link control connections.

Novell has often previewed the SAA product, saying it would provide 1,000 host sessions. However, neither Version 1.0 nor 1.1 later this summer will come close to that mark, according to a company spokesman.

"We've got machines just stacked around here," said Brad Dickey, a senior analyst at Conoco, Inc. in Houston. "We've got host-access servers, file servers, database servers . . ."

Dickey had yet to see Netware for SAA but said it could cut down on the number of dedicated machines spread throughout his combined 6,000-workstation network.

A money saver

Robert Biello, senior data communication specialist at Blue Cross/Blue Shield of Rhode Island, added that there would be a substantial cost savings for large companies that now have to buy and maintain gateways.

Gerry Machi, director of product marketing for Novell's communications products, said the Netware loadable module is the company's first runtime version of a product.

Netware for SAA Version 1.1, now in beta testing, will provide up to 254 concurrent sessions and two host links, Machi said. Adding another SAA module would increase the session maximum to 508 on a server.

Information systems managers will also have to wait for Version 1.1 for a status screen that is expected to show all logical units at once, noting, for example, which are connected.

Apple

FROM PAGE 1

current line of DOS-based portables — around $3,000. "I hope they can slim it down without lightening my wallet," said Arthur Masson, director of transportation system development at CSX Technology in Jacksonville, Fla.

Early indications are that the Sony notebook will retail for approximately $2,400, while the midrange will cost about $3,100. Both will start with 2M bytes of random-access memory and a 20M-byte hard disk. The high-end model is expected to sell for approximately $5,000 with 4M bytes of RAM and a 40M-byte hard drive.

The trackball pointing device will be centered below the space bar, although a standard mouse can be added. Sealed lead batteries will offer up to three hours of useful time.

Another important consideration is that the "display technology has got to feel and look like a Mac, not like it was just thrown together," Masson said. Early reports are that the new models will use backlit LCD screen technologies that also offer manual brightness controls.

A second effort

Apple's earlier portable was a disastrous misfire in a market that Framingham, Mass.-based International Data Corp. estimated will grow by 37% this year — more than five times faster than the growth rate in the desktop PC field.

Rick Marolt, information systems manager at Great Central Insurance Co. in Peoria, Ill., plans to issue the new Apple notebook models to field representatives handling claims and safety inspectors "if Apple comes through," he said. "Hopefully, the words *Macintosh* and *portable* will no longer be exclusive."

Macintosh lite

Apple Computer, Inc.'s plans for portables reportedly include a 5-pound version built by Sony Corp.

Apple's planned portables

Microprocessor	16-MHz 68000	16-MHz 68030	25-MHz 68030
Approximate weight	5 pounds	7 pounds	7 pounds
Random-access memory	2M-4M bytes	2M-8M bytes	4M-8M bytes
Hard disk	20M bytes	20M bytes	40M bytes
Probable price	$2,500	$3,000	$5,200

Source: International Data Corp.

CW Chart: Janell Genovese

Analysts said the pent-up demand for an adequate portable Macintosh is so great that product shortages could be felt almost immediately, much like those felt soon after last fall's introduction of the immensely popular Macintosh Classic. "All of the people who spent the last two years lugging around a Mac Portable are going to jump on these machines," said Ben Rose, a senior PC analyst at Technology Investment Strategies Corp. in Framingham, Mass.

Users are also getting increasingly fussy about not compromising power for portability. Apple's partnership with miniaturization giant Sony could help it steer clear of those shoals.

The Sony connection could also represent an important signpost for Apple, which is expected to abandon its proprietary architecture soon and begin licensing its operating system. "Apple is starting at zero in a very hot market, and it's very likely that you'll see Sony selling these products as well," said Benny Lorenzo, an analyst at Dillon Read & Co. in New York.

Cognos goes client/server

ANAHEIM, Calif.— Software tools developer Cognos Corp. last week outlined plans to migrate its Powerhouse suite of applications development products to a client/server architecture.

A new version of its Powerhouse fourth-generation language, Version 7.0, will support Microsoft Corp.'s Windows 3.0 graphical interface, with the first implementation slated to appear on Hewlett-Packard Co.'s MPE/XL platform late this fall.

Users will be able to reuse their existing applications on personal computers that have a Windows 3.0 interface and do cooperative processing, Cognos executives told a meeting of more than 700 users here. A multithreaded server feature will allow multiple Cognos applications to run on different Windows screens.

The key to Version 7.0's flexibility is a central repository stored on an Ashton-Tate Corp. Interbase database that contains "generic" descriptions of the screen formats that are used by a Powerhouse Version 7.0 application.

Cognos also introduced a Powerhouse version for the IBM RISC System/6000 and an enhanced version for Digital Equipment Corp. VAX systems.

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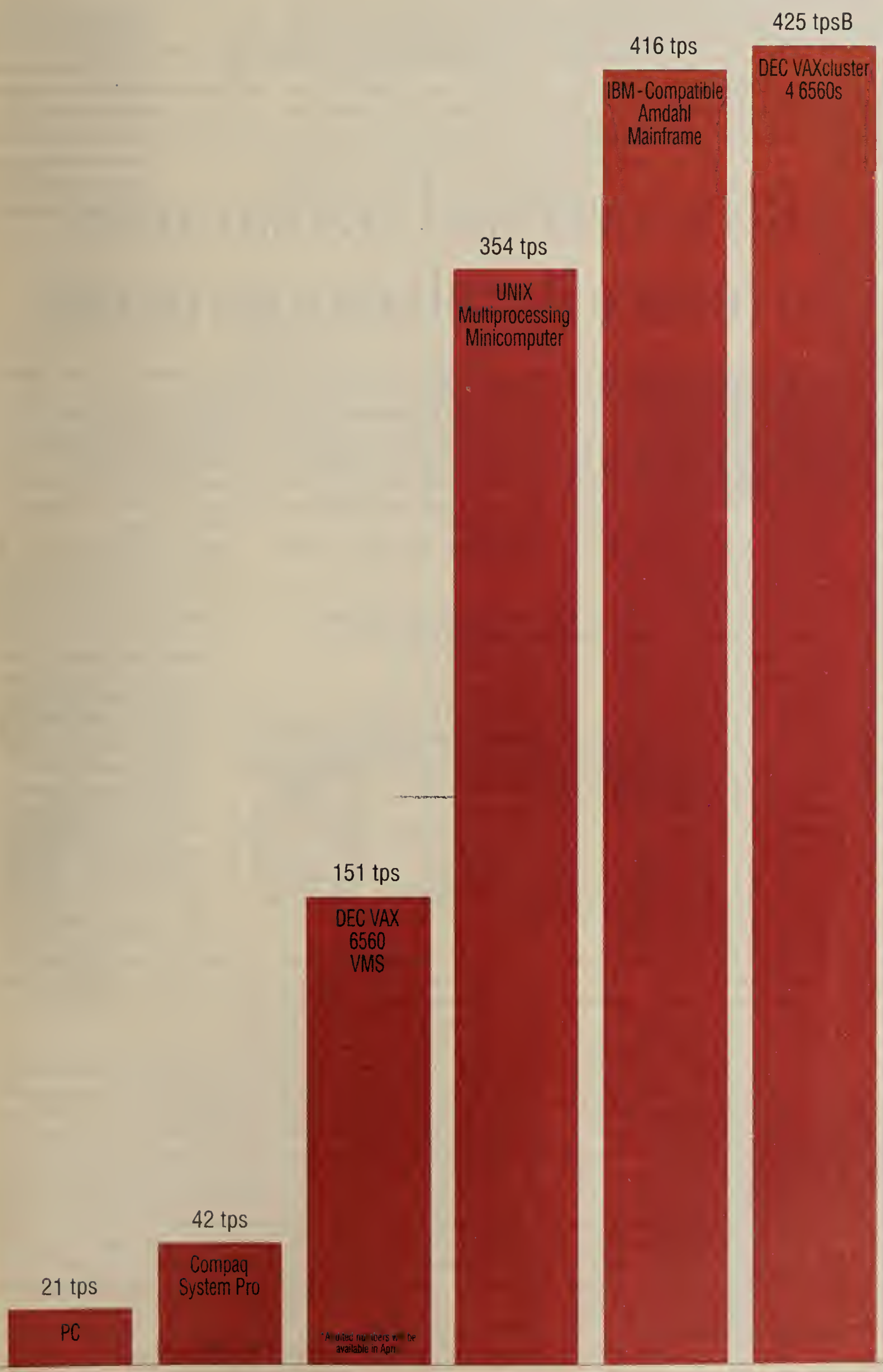

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Progress, problems for Unisys debt plan

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — There were almost equal measures of good and bad news last week for Unisys Corp., which announced the $207 million sale of its Timeplex, Inc. subsidiary but was also reported to be close to paying a $190 million penalty to the Pentagon to settle a long-standing procurement fraud case.

"We have said we will not be all things to all people," Unisys Chairman and Chief Executive Officer James A. Unruh said in a memo announcing the Timeplex sale to Unisys employees last week.

Unisys will focus on "providing mission-critical solutions on open networks in high-transaction environments," he said.

The Timeplex deal is the largest move to date in an asset-sale program launched early last year to reduce Unisys' debt. At the end of its first quarter in March, the company reported a debt of $3.3 billion.

Unisys has generated $500 million in cash from the sale of Timeplex, various real estate holdings, a portion of its equity in its Japanese joint venture and — just two weeks ago — $131 million worth of lease receivable-backed certificates from its leasing arm. Unisys has said its debt-reduction target this year is $600 million.

Timeplex was purchased in January 1988 for 10 million Unisys shares, which were then selling for $33 per share. At the time, the value of the transaction was $330 million.

"We are not taking a loss, and we may report a slight gain," a Unisys spokesman said. Since 1988, the book value of the subsidiary has risen from $125 million to $200 million, he noted.

Financial observers who had predicted Unisys would sell off the profitable data communications equipment unit agreed. "Because of accounting rules, they can sell it for less than they bought it for and still break even," explained David Schofield, an analyst at Duff & Phelps Investment Research Co. in Chicago.

TIMEPLEX TERMS

▶ New owners: Ascom Holding AG ($2 billion company and 51% partner) and South African Mercedes Information Technologies Ltd.

▶ Dewaine Osman to remain Timeplex president.

▶ Separate U.S.-based Timeplex business unit to handle government contracts.

▶ $207 million cash sale slated to close Aug. 31.

The timing of the sale was significant, Schofield added. Unisys, he said, wants to complete the transaction by Aug. 31, just two weeks before a $300 million public note matures on Sept. 15.

On the reported Pentagon settlement, a Unisys spokesman said the company was still negotiating with the U.S. Department of Justice. He would not confirm the details of a story published June 10 in *The Wall Street Journal*, which reported Unisys had agreed to a $190 million settlement.

However, in a statement issued last week, Unisys did say the company was negotiating for a cash settlement over a five-year period, a previously disclosed forfeiture of profits from the North Warning radar system contract and contingency payments based on possible asset sales and the company's return to profitability.

Unisys said it did not believe that the settlement package would have a "material financial impact" on the company, the spokesman said.

Unisys does have some cushion for the penalty, however. In the third quarter of 1989, it set aside $150 million, the majority of which it said was for the Pentagon case. The Pentagon case stems from the government's "Operation Ill Wind" investigation into illegal activities of military contractors.

Meanwhile, analysts speculated that an end to the Ill Wind case may actually bring the $10 billion corporation closer to a larger strategic goal: that of selling its defense unit and honing its business along the lines described by Unruh last week.

Timeplex

FROM PAGE 1

Timeplex's strength from a service and marketing standpoint." Unisys, which purchased Timeplex in early 1988, reported a $3.3 billion debt at the end of its first quarter in March (see story above).

"Unisys has been a dark cloud," said Michael Ackermann, systems engineer on the network services staff at Blue Cross/Blue Shield of Michigan in Detroit. "While its ownership of Timeplex has not had much tangible impact on us, its presence has given us a lot of explaining to do to executive management at product acquisition time."

However, government users were less upbeat. Some said they were concerned about Timeplex's now-foreign ownership and the fact that one of the new owners is based in South Africa.

William Micklin, manager of the bureau of telecommunications for the city and county of San Francisco, said the ownership issue will prohibit him from considering Timeplex in an upcoming bid because of strict city and county ordinances against doing business with any South African-owned company.

"The sale will really put them out of business with us," he said, "and that's unfortunate, because Timeplex has one of the best boxes on the market."

Government user Jim Webster, a department head within the Directorate of Naval Telecommunications at the U.S. Naval Intelligence Command in Suitland, Md., said he had "grave concerns" about the sale.

"I would not want representatives of a South African firm having access to U.S. government-owned facilities," he said. He added that the sale "will certainly cause us to do a lot of soul-searching on future procurements."

A separate Timeplex entity will be set up to handle government contracts because of federal regulations prohibiting classified agencies from doing business with any foreign-owned firm, Timeplex President Dewaine Osman said. Government sites reportedly represent about 8% of Timeplex's business.

Not an issue

"In a legal sense, I don't think there's an issue for government agencies buying products from a South African entity," said Richard Malone, principal at Vertical Systems Group, a market research firm in Dedham, Mass. "All the local and federal agency regulations concerned with South African sanctions say you cannot be an investor in a South African venture, not the other way around."

John Faccibene, vice president of telecommunications at brokerage firm Garban Ltd. in New York, called foreign ownership "a trend being led by the likes of AT&T and IBM. Technology is a global issue. Ascom is eager to make inroads into the U.S. and will probably make Timeplex more aggressive."

Nongovernment Timeplex customers, Osman said, "will have the same service, sales and management people dealing with them." However, six-year Timeplex customer Jack Sadler, group manager of technical services at Lucky Stores, Inc. in Dublin, Calif., said that when Unisys bought Timeplex, he noticed field and management personnel changes that made his relationship with Timeplex "less desirable than it had been."

IRS to overhaul system in bid to reduce its reliance on paper

BY CAROL HILDEBRAND
CW STAFF

WASHINGTON, D.C. — A massive system overhaul at the Internal Revenue Service holds promise of an IRS that not only answers questions more promptly but also pries tax dollars out of reluctant pockets more successfully.

The $8 billion task, some segments of which are already under way, was announced last week. The multipronged effort should do much to move the tax collection system away from a paper-intensive process supported by isolated and outdated processing to a totally integrated electronic system.

"There's got to be a reason that every other major financial institution in the country has gone this way," IRS spokesman Henry Holmes said.

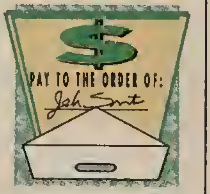
The project, under development for nearly three years, includes the following broad goals:

- **Streamlining service.** Such projects as the Taxpayer Service Integrated System will give IRS representatives databases that allow them to quickly access information needed to answer queries, which will cut down the number of manual searches, follow-up calls and correspondence. A second system will enable the agency to update taxpayers' records of payments quickly. The agency said it will eliminate 95% of notices that currently go out after payment has been made.
- **Encouraging electronic filing of taxes.** Since its inception in 1986, the electronic filing program has grown from 25,000 to 4.2 million electronically filed returns in 1990.
- **Updating collection techniques.** Networked databases of information should allow for more efficient enforcement. Today, only about 2% of the IRS' tax account data is on-line.
- **Turning paper into electronic data.** Using an imaging system to convert paper documents into electronic images, the IRS will then maintain data on integrated databases that provide on-line access to taxpayer information.

Tax man goes techie

The IRS is embarking on a 10-year automation plan

- **Implementation time:** Full completion targeted by the year 2000.
- **Estimated cost:** $8 billion.
- **Key goals:** Improve service to taxpayers, streamline case processing, emphasize electronic tax filing and use information technology to cut failure to file returns.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Holmes said the project will have a tremendous impact on almost every aspect of the IRS. "You can't just look at the tax system modernization as a change in technology," he said. "It is inseparable from operations."

Holmes targeted the electronic filing and imaging projects as particularly important. "The key is getting data into electronic format and then organizing it correctly," he said.

Smooth implementation of the modernization project will not be simple. The agency said the project should pay for itself with productivity gains as well as increased tax collection, but funding for the 10-year duration of the project is subject to the yearly whims of Congress.

Holmes said the agency is currently in "fairly good shape" regarding funding, although there has been congressional debate about deferring some of that spending until fiscal 1992. Speaking at a press briefing last week, IRS commissioner Fred T. Golberg Jr. said he considers that "not a good idea."

According to an official at the IRS' General Accounting Office (GAO), which will be involved in overseeing the plan, the very scope of the effort will expose it to heightened scrutiny. "They have something like 20 major procurements that they're going out on the streets for over the next few years," said the official, who asked to remain anonymous. "The IRS really needs to get a congressional buy-in."

A Senate hearing on the subject is set for next week.

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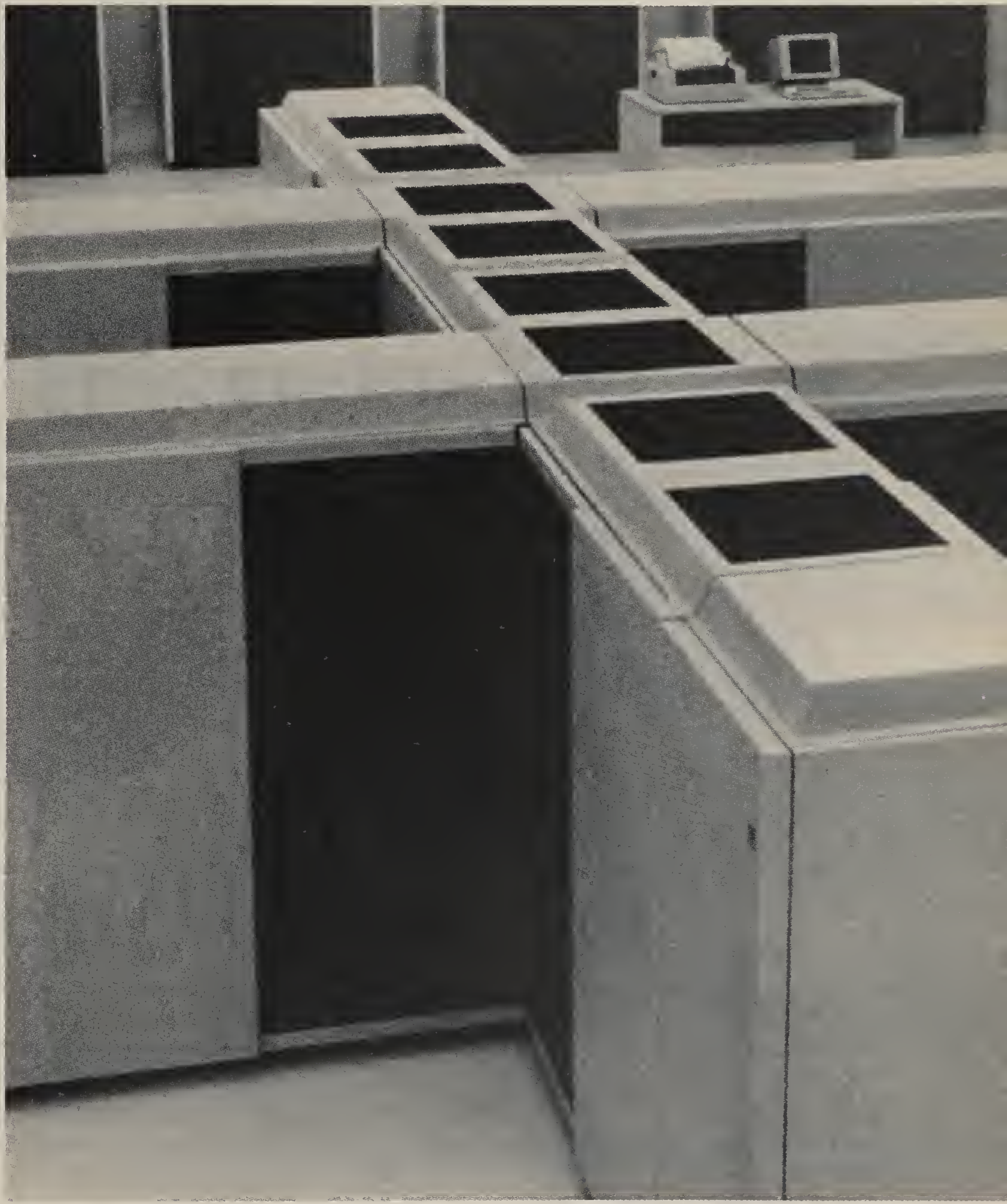

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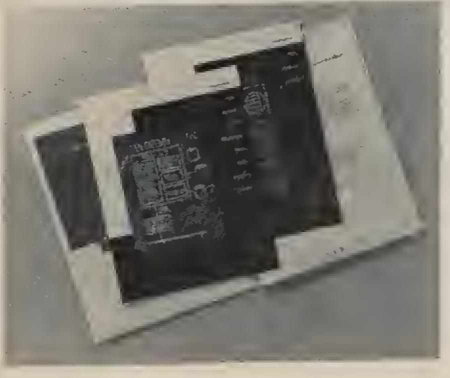

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FROM PAGE 1

personal computers from Convergent Technologies, Inc. with PS/2s or equivalent machines, Anderson said.

"We are getting a ton of power with this change. It's like going from a PC to a mainframe," Anderson said of replacing the Unisys Megaframe computers with RS/6000s.

Among the key strategic benefits the CIO identified are the competitive advantage of an open architecture with better price/performance, portable Unix-based software and the ability to put full-motion video on the financial advisors' workstations in the future.

Moving to the RS/6000 platform makes Prudential Securities a prominent example of the accelerating trend toward cost-effective computing with reduced instruction set computing (RISC) technology, said Paul Zagaeski, a senior analyst at The Yankee Group in Boston.

"Customers are extending the business, gaining flexibility and power while cutting costs," Zagaeski said.

As of last week, Prudential Securities was still negotiating final contract terms with its market data vendors. The hardware and software platforms will be settled, however, after a yearlong pilot project testing a variety of RISC machines.

Joyce Ravid

Anderson *counts on saving $7 million yearly*

The change affects only the branch network at this point. Unchanged in the computing scenario is the corporate data center in Brooklyn, N.Y., which is anchored by an IBM 3090 Model 600, an Enterprise System/9000 Model 720 and a Digital Equipment Corp. Vaxcluster.

An IBM spokesman confirmed last week that this RS/6000 deal ranks among the largest and most significant commercial sales of the Unix-based platform first introduced in February 1990.

In Prudential Securities' branch offices worldwide, the RS/6000 Model 320s and 530s will act as servers, running AIX, IBM's Unix variant, with a Sybase, Inc. database handling client and brokerage applications written in C for portability.

Also significant is the full IBM Systems Network Architecture LU6.2 connectivity established between the corporate mainframe host and the Unix machines.

"Establishing that took a good bit of work," Anderson said. "With LU6.2, we can share the same communication network, and that gives us the ability to multidrop on the same line, so we have multiple branches on the same line."

In Prudential Securities' domestic branches, the PS/2s rolled out in 1993 will replace the Convergent PCs. Linked by an IBM Token Ring network, the PS/2s will handle quote delivery to the branches. Automatic Data Processing, Inc. (ADP), a market data vendor, will provide the software that drives the quote system as the information arrives from New York over a newly installed GTE Corp. satellite network.

Sybase is replacing ADP's proprietary database system, which now runs on the Convergent PCs.

The expected tenfold jump in reliability refers to the difference in mean time between failure for the Convergent PCs installed in 1984 and the new PS/2s.

Byron Walker, an analyst at Moody's Investors Service in New York, said the RS/6000 is making "very definite inroads" in the commercial market.

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Hyatt rewards IS downsizer

CHICAGO — Hyatt Hotels Corp. last week rewarded Gordon Kerr for an application downsizing job well-done by promoting him from vice president to senior vice president of MIS.

Hyatt's move from an IBM mainframe-based reservations system to one using Unix processors and a relational database management system [CW, Sept. 24, 1990] has resulted in more than a 20% cost savings over the old system, which cost $7 million to $8 million per year in leasing and maintenance.

"Saving money per se wasn't the issue. It was how quickly we could respond to changes in the marketplace," Kerr said.

Yesterday, in fact, Hyatt rolled out "Hyatt Vacations," a new program that enables travel agents and individual travelers to price and package a Hyatt guest's airfare, Hyatt hotel stay and entertainment reservations in one step.

The program required the creation of an interface between Hyatt's central reservations system in Chicago and an IBM Application System/400-based travel voucher application run by the technology division of MTI Vacations in Oakbrook, Ill. Hyatt's central reservations system uses AT&T's System 7000 Unix processors and a DBMS from Informix Corp.

"The interface could have been ugly if we'd still been dealing with a mainframe and a TPF system," said Kerr, referring to IBM's Transaction Processing Facility.

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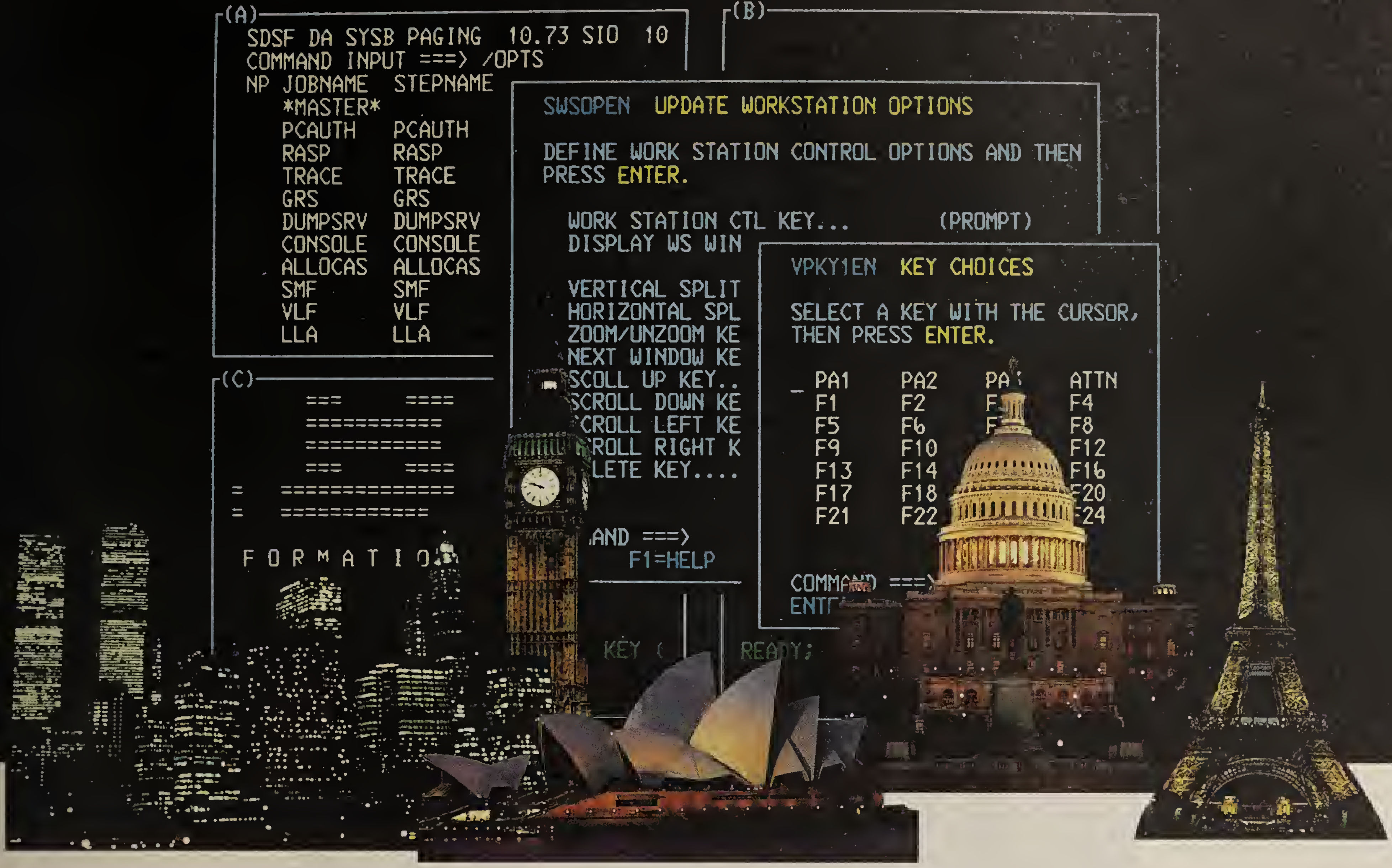

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   CONSOLE  CONSOLE
   ALLOCAS  ALLOCAS
   SMF      SMF
   VLF      VLF
   LLA      LLA
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(B)
SWSOPEN  UPDATE WORKSTATION OPTIONS

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  DISPLAY WS WIN

  VERTICAL SPLIT
  HORIZONTAL SPL
  ZOOM/UNZOOM KE
  NEXT WINDOW KE
  SCOLL UP KEY..
  SCROLL DOWN KE
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    ROLL RIGHT K
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  KEY (         READY;
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VPKY1EN  KEY CHOICES

SELECT A KEY WITH THE CURSOR,
THEN PRESS ENTER.

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  F1     F2     F      F4
  F5     F6     F      F8
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AT&T, NCR sketch product continuity plan

Tower will go, but NCR System 3000, AT&T 3B2 among those to survive

BY MICHAEL FITZGERALD
CW STAFF

NEW ORLEANS — The Tower will fall, but few other product cuts were offered by NCR Corp. and AT&T's Computer Systems Division last week as they outlined plans for merging their product lines.

The plan, which was presented to AT&T's computer sales force, was the first concrete statement the two companies have publicly made about how their merger will affect customers.

NCR's System 3000 series will remain intact, and so will such products as AT&T's 3B2 line of minicomputers and System 7000 line of high-end parallel processors — at least in the short term.

> NCR's SYSTEM 3000 strategy becomes the future direction of both companies.

"What we're doing to a great extent is integrating what exists," said Gilbert P. Williamson, NCR's president and future chief executive officer.

Analysts found no surprises in the announcement.

"They have to do it in this sort of gentle way," said Judith Hurwitz, editor of the newsletter "Unix in the Office," published by Patricia Seybold's Office Computing Group in Boston. Hurwitz cited a particular need to protect customers with recent investments in AT&T equipment.

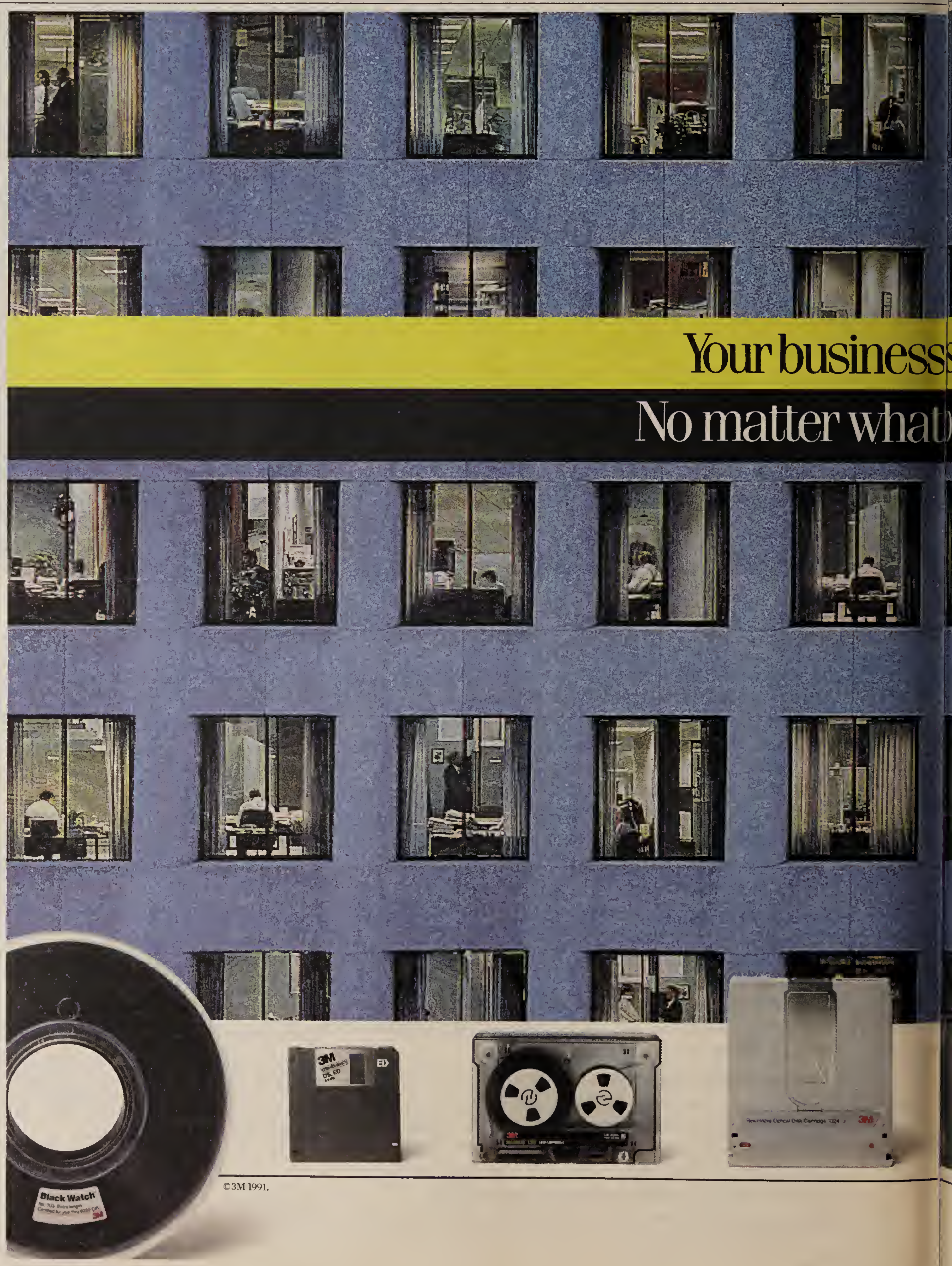
Chris Christiansen, an analyst at Meta Group, Inc. in Westport, Conn., said he considered the announcement "very positive in that it's rare to see two computer companies come to an agreement about product consolidation so quickly and decisively."

As it stands, NCR's System 3000 strategy becomes the future direction of both companies. Among the specifics of the plan are the following:

- **Personal Computers:** NCR's Micro Channel-based machines will stay, while AT&T's Extended Industry Standard Architecture machines will go. Safari Systems, the laptop joint venture between AT&T's Computer Systems Division and Marubeni America Corp., will sell its Safari laptop as a high-end portable, while NCR's 3120 portable will remain as a low-end offering.
- **AT&T 3B2:** Users will be offered an upgrade in July to a chip set made by Mips Computer Systems, Inc. This will be the last upgrade for the machine. Users of AT&T System 7000s will be given one more upgrade, also to a Mips chip set (Pyramid Technology Corp. manufactures the 7000), but NCR will not add any future upgrades that Pyramid may introduce. NCR's Tower line of Motorola, Inc.'s 68000-based minicomputers will not be upgraded again, according to Williamson.
- **On-line transaction processor (OLTP):** NCR's Top End will support OLTP. AT&T's Tuxedo product will be marketed and supported by Unix Systems Laboratories, Inc.
- **Office automation environments:** NCR's Cooperation package and AT&T's Rhapsody will be merged into Cooperation 2.0 to be released late this year or early next year.

"There's no question that every time a choice had to be made on an important strategic issue, it went to NCR," said Thomas Nolle, president of CIMI Corp. in Voorhees, N.J. Nolle said, however, that the 7000 and 3B2 upgrades "may be a lurking minefield" because of their incompatibility with NCR's Intel Corp.-based strategy.

Under the plan, AT&T resellers will begin selling NCR equipment July 1.



Cabletron, Silicon Graphics form net link

BY JOANIE M. WEXLER
CW STAFF

Cabletron Systems, Inc. and Silicon Graphics, Inc. said they will announce a cross-breeding of their well-received yet neophyte network management systems today. The result, users said, could be a blue-blooded system that greatly reduces headaches in managing heterogeneous, distributed corporate networks.

The size of data-laden networks snaking around the globe is growing in direct proportion to their importance to businesses' bottom lines. The result: a need for tight network control that is expected to yield a 75% boost in Fortune 1,000 network management budgets during the next two years, according to Business Research Group, a market research firm in Newton, Mass.

The two vendors appear to be addressing that trend with the intent to integrate Cabletron's Simple Network Management Protocol (SNMP)-oriented Spectrum enterprise manager and Silicon's Netvisualizer, a graphical network traffic monitor. The two vendors said they will continue to offer the systems as stand-alone products as well.

Leap forward

The integrated version "will advance network management by five years," said Dan McCormick, manager of networking and integration at GTE Contel Federal Systems, a Netvisualizer user in Chantilly, Va.

McCormick said he fully expects to purchase the integrated product. "Ironically, I almost purchased Cabletron's Spectrum instead of Netvisualizer," he said. "However, at the time, I didn't have the need for SNMP management that I have today."

Spectrum is Cabletron's Unix- and artificial intelligence-based management system, which provides a top-down view of networks and allows users to manage and reconfigure networks actively from a central workstation.

Netvisualizer is Silicon's three-dimensional network monitor that produces graphical, real-time views of network traffic but does not allow remote action. The graphical orientation eliminates the need to pore through pages of text to determine which protocols are running and what is happening to data packets, users said.

Time-saver

"The attractive thing about [Silicon's] alliance with Cabletron is that it brings SNMP capabilities such as remote configuration to our traffic monitor," said Netvisualizer user Rick Fairbourne, data communications specialist at Westinghouse Idaho Nuclear Co. in Idaho Falls, Idaho. "Currently, we traipse halfway across our plant and spend an hour to do five minutes' worth of work."

Lehman Brothers in New York is currently in negotiations for Spectrum. "The remote capability is important because if the network gets overloaded, the first thing you have to determine is who is on the network and what they're doing. That becomes immediately apparent with Netvisualizer," said Victor Duchovni, senior systems analyst at Lehman Brothers.

Netvisualizer data stations are stand-alone hardware/software devices that sit on and monitor network segments. They will become another item on the 40-odd list of device types managed by Spectrum. As a management device, Netvisualizer passes to Spectrum information about a whole network segment, not just about itself.

Spectrum started shipping in April. With more than 30 beta-test users, the vendor has stated sales goals of 100 systems in the first year. Netvisualizer has been on the market for approximately one year and is installed at about 100 sites.

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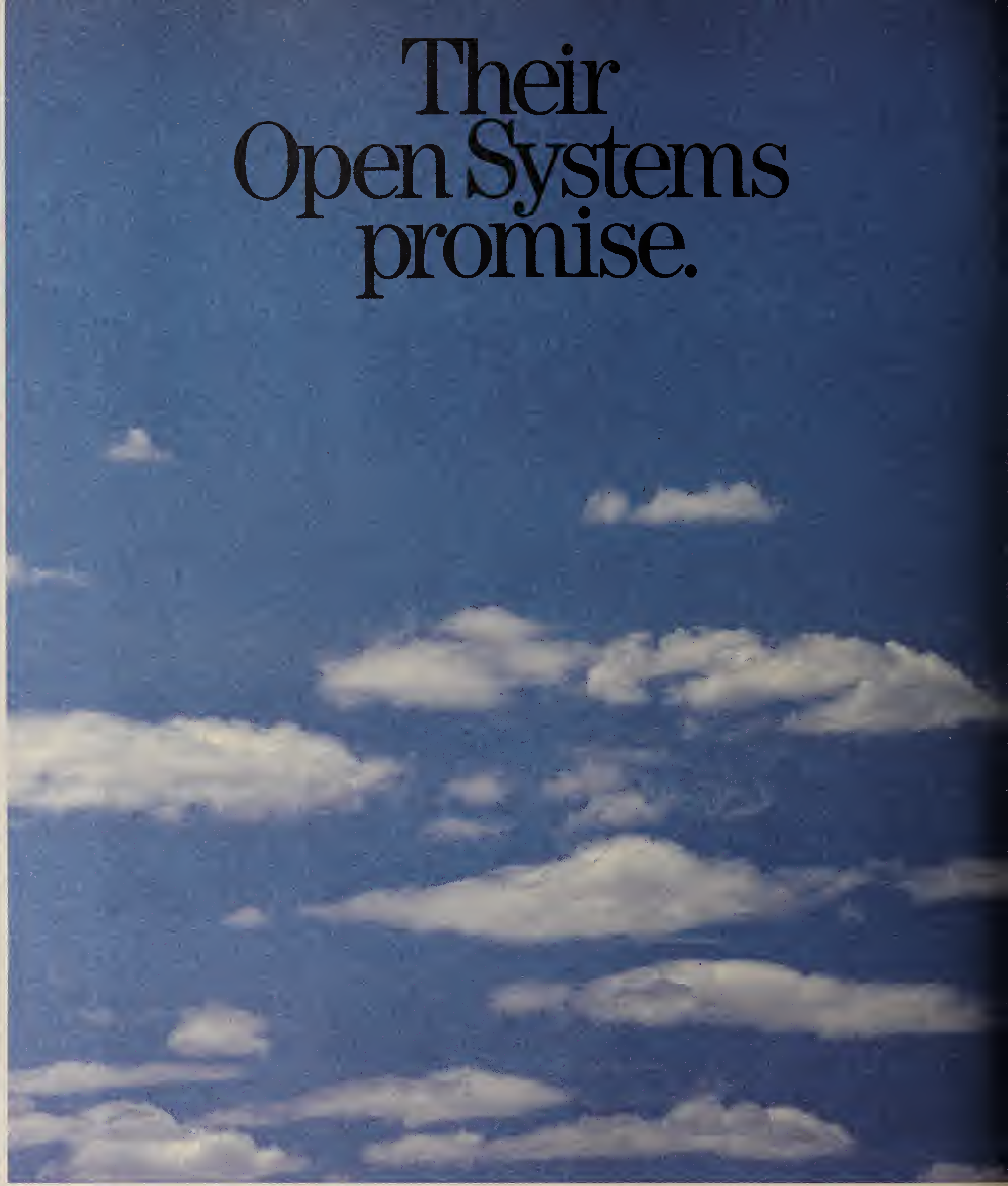

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HEWLETT
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IBM tries PC trade-ins — again

BY RICHARD PASTORE
CW STAFF

WHITE PLAINS, N.Y. — IBM's second stab at a personal computer trade-in program, announced last week, is more liberal than its first, and it may turn out to be more popular as well. IBM's offer last week to let Personal System/2 buyers trade in older boxes and even non-IBM equipment for new PS/2s piqued the interest of users who are saddled with relic PCs that cannot adequately run new software.

IBM's dealers will offer trade-in credits for older IBM PCs when customers purchase new PS/2s through the end of the year. Reaching into the markets of its competitors, IBM will also provide trade-ins for customers' old Apple Computer, Inc. and Compaq Computer Corp. boxes — something it has not tried before.

IBM had yet to specify late last week exact trade-in pricing and products affected. The company did say it will grant a "fair market value" for the trade-in and then add on an additional amount, depending on which new PS/2 the customer intends to buy. Trade-in rebates will range from $200 to $1,200, IBM said.

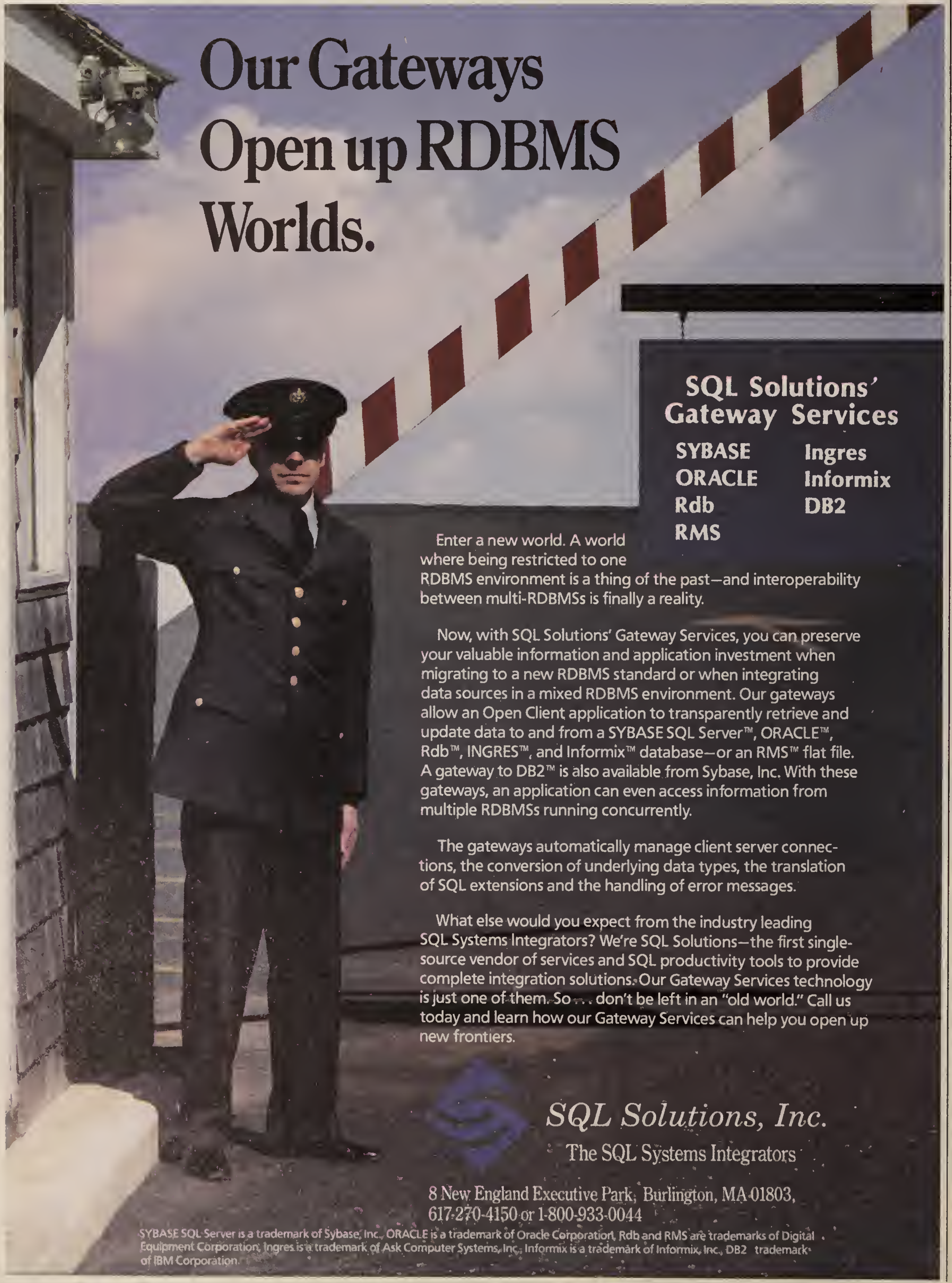
The program is more generous than IBM's trade-in attempt in 1988. That program offered customers less than secondary-market value for their old PCs and created a logistical nightmare for dealers. It was discontinued after a few months.

In the past, PC buyers have been cool toward trade-in programs [CW, Jan. 14]. Many sites have had desktops to which they could pass down older boxes. However, other users said they like the idea of a trade-in program because "antiques" such as the Intel Corp. 8088-based IBM XT are no longer serviceable. "Some of the software just won't run on XTs," said William Tignanelli, vice president at Federal Reserve Bank's Baltimore branch.

For example, it is difficult to run the latest version of Wordperfect Corp.'s Wordperfect on an XT while simultaneously maintaining an electronic mail hookup, he said. The Baltimore bank has approximately 35 XT-class boxes out of 200 PCs. Tignanelli said IBM's concept has appeal for the bank, which has found it financially difficult to upgrade older PCs on a large scale.

Even old Intel 80286-based PCs can be a problem. At County Natwest, Inc. in New York, 286s are precluded from use on the network because the network software resides in extended memory and thus requires a more advanced box, project analyst Bruce Greif said.

Some dealers are also enthusiastic about the program. "It seems impressive in terms of price, and if that's the case, it should be successful" in generating new sales, said Matt Fitzsimmons, owner of a Computerland Corp. franchise here.



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Superstores win premium PCs

BY RICHARD PASTORE
CW STAFF

FORT WORTH, Texas — Discount superstores have finally succeeded in plucking the biggest plums in the personal computer industry, even as traditional dealers are forced to consolidate to stay alive. Following close behind superstore authorizations by Apple Computer, Inc. and Compaq Computer Corp., Tandy Corp. announced plans last week for a subsidiary superstore chain that will peddle not only Tandy boxes but also IBM, Apple and Compaq PCs.

Tandy's planned Computer City superstores and other recent deals between major vendors and superstores indicate that the concept has come of age. Regarded as cut-rate pushers of second-tier PCs, superstores have been slighted by many corporate buyers because they lacked premium brands and because support and service were suspect.

"Corporations like us are looking for a business relationship with their dealer — not a cash-and-carry relationship," said Stephen Rood, manager of microcomputer technology at Coopers & Lybrand in New York. "Support is more critical than price of the initial purchase," added Greg Faries, manager of end-user computing at Black & Decker Corp.'s corporate headquarters.

Whether big names will change this corporate opinion of superstores remains to be seen. Compaq does not expect its corporate customers to shift to superstores; it is hoping to make its products more accessible to the small business and consumer markets, said Douglas Johns, vice president of corporate marketing.

Some industry observers said they expect superstores to handle $5 billion in revenue in 1992. By 1994, these mass merchants could command nearly 20% of U.S. PC sales, while traditional dealers' share erodes to 38%, according to Dataquest, Inc.

Last month, Apple authorized national superstore chain CompUSA, formerly Soft Warehouse, to sell the Apple Macintosh Classic, LC and IISI, along with several low-end printers.

Also last month, Compaq authorized the Bizmart superstore subsidiary of Intelligent Electronics to resell the entire Compaq line, except for the Systempro and certain high-end Deskpro models.

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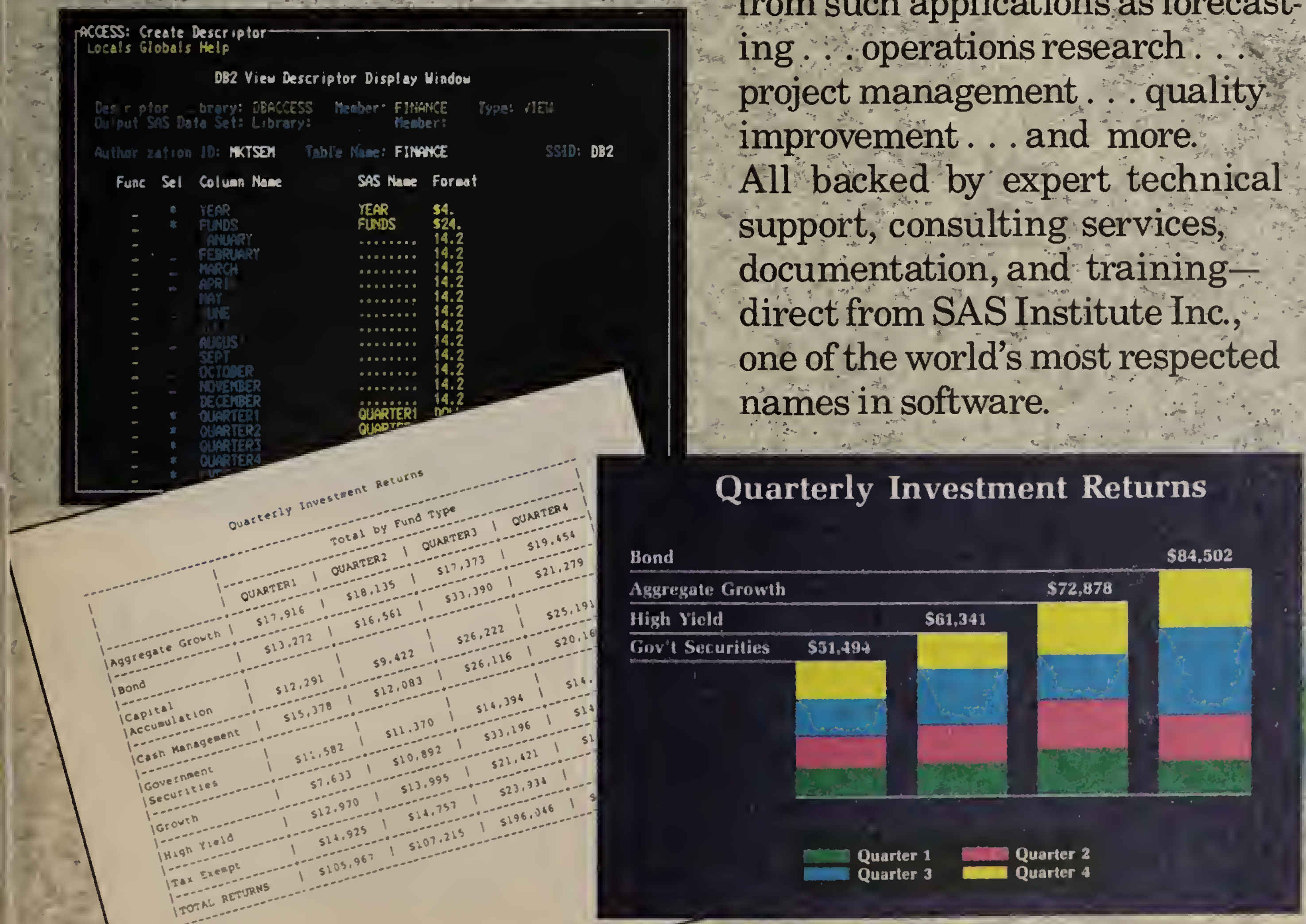

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ACCESS: Create Descriptor
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                 DB2 View Descriptor Display Window

Des r ptor   brary: DBACCESS   Member: FINANCE    Type: VIEW
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Author zation ID: MKTSEM    Table Name: FINANCE           SSID: DB2

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    _          ANUARY              ........  14.2
    _     _   FEBRUARY             ........  14.2
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Quarterly Investment Returns

	Total by Fund Type			
	QUARTER1	QUARTER2	QUARTER3	QUARTER4
Aggregate Growth	$17,916	$18,135	$17,373	$19,454
Bond	$13,272	$16,561	$33,390	$21,279
Capital Accumulation	$12,291	$9,422	$26,222	$25,191
Cash Management	$15,378	$12,083	$26,116	$20,16
Government Securities	$11,582	$11,370	$14,394	$14,
Growth	$7,633	$10,892	$33,196	$1
High Yield	$12,970	$13,995	$21,421	$1
Tax Exempt	$14,925	$14,757	$23,334	
TOTAL RETURNS	$105,967	$107,215	$196,046	$

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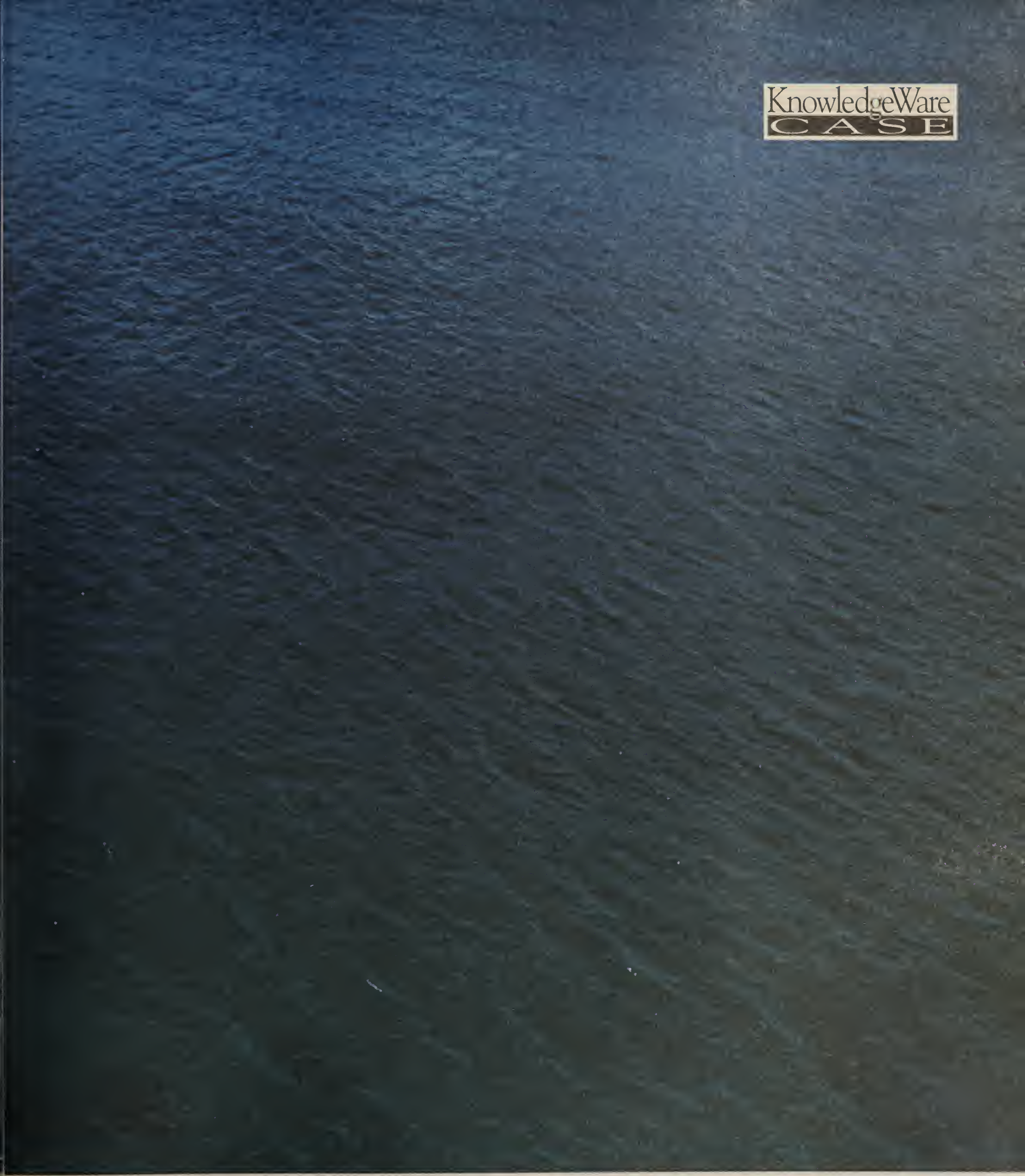

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TECH TALK

Damming the data deluge

■ Scientists at Los Alamos National Laboratory have developed a new model, called Electronic Data Publishing, for disseminating research information. Under the plan, scientific data bypasses technical journals and flows directly into a computer database, where it becomes immediately accessible to a worldwide community of researchers. Electronic Data Publishing reflects a dramatic change in the way researchers share data and will also make it possible to distribute data that is too massive in scope for conventional scientific journals. The scientists developed the plan to cope with the deluge of data flowing from efforts to decode the genetic makeup of humans and other life forms.

Interactive teaching aid

■ The U.S. Department of Education has awarded the National Science Teachers Association $400,000 to fund the production of the first compact disc-interactive (CD-I) science project in the U.S. CD-I is a multimedia technology on 4.7-in. optical disc developed by Philips Telecommunications N.V. and is slated to debut as a consumer product this year. The grant will be used to develop a disc that will help evaluate school science and math programs and improve teaching in the subject areas.

Controlled chaos

■ Chaotic behavior obeys simple laws but ones that are so complicated that events may seem to occur at random. However, chaotic behavior is not random; it is just extremely sensitive to existing conditions. If you find such reasoning, well, chaotic, then perhaps Chaos Demonstrations is what you need. The IBM Personal Computer and compatibles software package was designed to allow users to interactively explore basic concepts of chaotic dynamics. It costs $70 and is available from Physics Academic Software and North Carolina State University in Raleigh, N.C.

On the road with computer routing

Complex chips calculate efficient paths for traveling salespeople, circuitry and more

BY MICHAEL ALEXANDER
CW STAFF

Computer scientists around the world are concentrating on a mathematical challenge that may one day allow computer chip makers to produce more complex chips and save money at the same time. The challenge, called the traveling salesman problem, is slowly giving way under a combination of brute computational force and sophisticated software designed to solve the more than 150-year-old problem.

The traveling salesman problem is an attempt to find the shortest tour around a collection of cities for a traveler who has to stop only once at each location and then return home to his starting point.

Finding the shortest possible route has practical applications in areas as diverse as the design of computer circuitry to airline route management. For example, solving a traveling salesman problem could be used to determine the most efficient way to drill thousands of holes in a circuit board to accommodate wiring and chips. Finding the quickest and shortest path to drilling the holes could save a manufacturer a substantial amount of money.

The problem is more daunting than it may seem at first: Suppose a salesperson planned to visit 10 cities on a sales tour and then return home. Because any one of 10 cities could be visited first, and any one of the remaining nine could be second, and so on, finding the route with the shortest total mileage with 100% accuracy would require multiplying 10 x 9 x 8 x 7 and so on for the possible number of tours. The product is 3,628,800.

The problem becomes increasing complex as the number of cities increases. For example, an 11-city tour would boost the number of calculations to 39,916,800 to arrive at 100% accuracy.

Computer scientists have solved problems with 2,392 cities and are preparing to tackle a 3,038-city problem.

Theoretically, given time and enough computer power, a traveling salesman problem of any size could be solved, said David Johnson, who heads the mathematical foundations and computing department at AT&T Bell Laboratories in Murray Hill, N.J. Johnson and Jon Bentley, another Bell Laboratories computer scientist, are recognized by computer scientists as experts in solving traveling salesman problems.

Janell Genovese

For example, Johnson has developed software code that will get within 1.5% of an optimal solution for a tour of 100,000 cities within 12 minutes. Bentley has solved the 1 million-city problem within 3% of the optimum in three to four hours.

To find the optimal solution to a problem would exponentially increase the complexity and time needed to solve the problem. Instead of two or three hours, the problem could take 1,000 times as long to solve, Johnson said.

Close enough

An approximate solution is often adequate for practical application, Johnson said. In many instances, the last 1% or 2% may be enough to cut in half the time needed to complete a task. Some tasks, such as using a laser to drill holes in a circuit board, may not require optimum accuracy.

It is not certain where the traveling salesman problem originated, but it is believed to have come from a handbook for salespeople published in Germany in 1832. The final chapter urged readers to schedule sales tours so as to cover as many locations as possible without visiting the same location twice.

Manford Padberg at New York University's Courant Institute of Mathematical Sciences and Giovanni Rinaldi at the Institute for Systems Analysis in Rome hold the current record for an exact solution to a traveling salesman problem. The two calculated the optimal tour of 2,392 cities in 1988 using a method developed by researchers at Bell Laboratories.

Supercomputer speed records under siege

BY MICHAEL ALEXANDER
CW STAFF

Supercomputer speed records are being set up and knocked over like bowling pins.

In March, researchers at the University of Tennessee declared a parallel computer built by Thinking Machines Corp. to be the world's fastest. Last month, an Intel Corp. Touchstone Delta housed at the California Institute of Technology (Caltech) grabbed top speed honors. Only a few days later, the record went to a newly unveiled Thinking Machines supercomputer. Last week, computer scientists at Caltech and Intel said the record was firmly back in their hands.

Supercomputers are playing an increasingly crucial role in solving so-called "grand-challenge science problems." Super-fast, high-performance machines are being used for such tasks as modeling and simulating global climate change, searching through large volumes of radio-telescope data for the faint and complex signatures of binary pulsars and visualizing scientific data returned from the National Aeronautics and Space Administration's Galileo and Magellan spacecrafts.

On June 4, Thinking Machines introduced a machine that is 50% faster than current models and can be shared by more than 100 users at one time. The CM-200 is capable of performing 9.03 billion mathematical calculations per second to solve a set of linear equations used in the Linpack benchmark. The speed is only slightly faster than that set by the Touchstone Delta, which handled 8.6 billion calculations per second on May 31.

In one recent benchmark test, the Touchstone Delta topped out at 10.2 billion calculations per second, and it will probably go to 12 billion calculations per second after initial diagnostics and other tests are completed, said Elliot Swan, manager of product and technical marketing at Intel. "It's the most powerful machine today; the record is back," Swan said last week.

The speed of supercomputers is a topic of considerable debate among manufacturers of parallel processing and other types of high-performance computers, Swan said. For example, it is difficult to compare parallel processing machines that break a problem into pieces and work on each piece simultaneously with more conventional supercomputers that attack a problem one piece at a time.

The speed duel probably means little to potential customers, according to one analyst. The true measure of speed is how fast the supercomputer can run the customer's own code, he said.

"Benchmarking is a black art, and that is true from PCs to supercomputers," Swan said. The Linpack benchmark test is universally accepted and considered a useful measure of supercomputer speed, he said.

Although raw speed is not the sole reason customers choose one supercomputer over another, Swan said, "being able to crow about being the fastest has some value."

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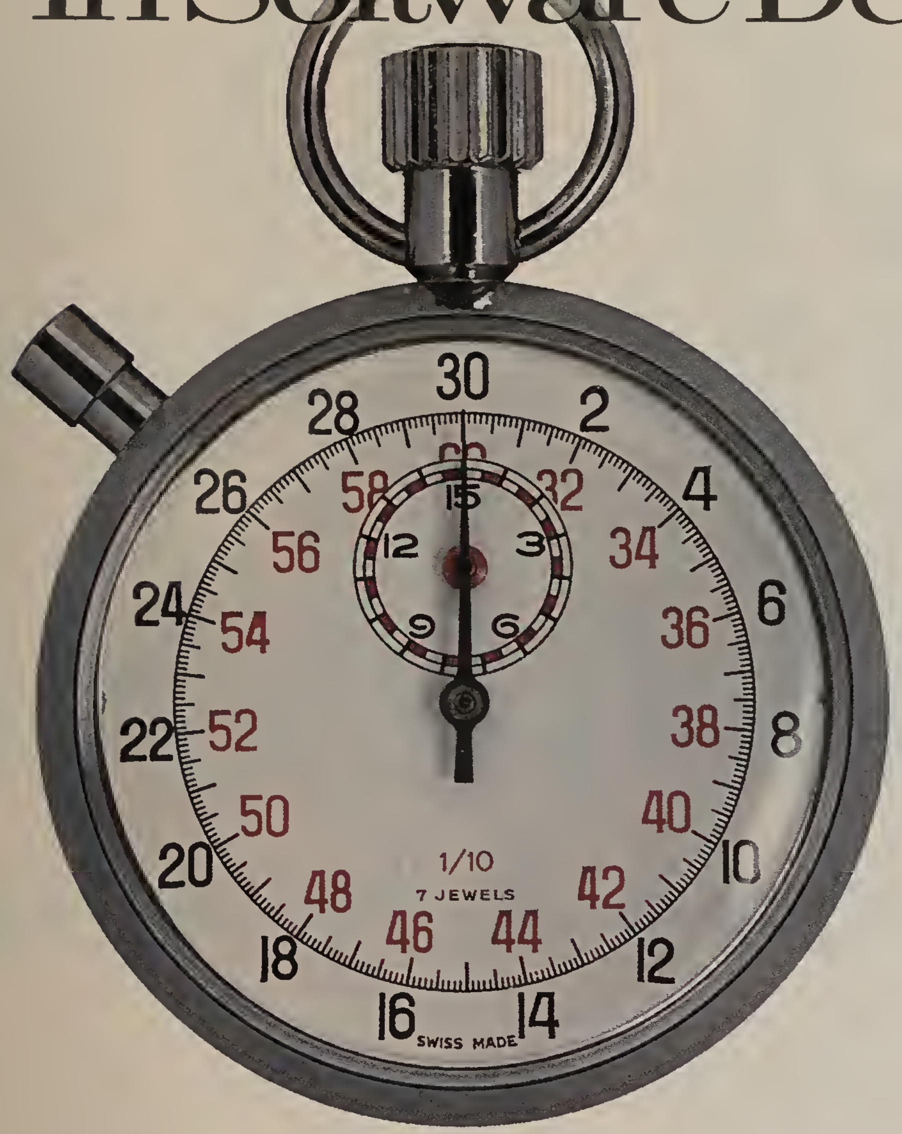

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EDITORIAL

The human side

It is very easy and common to think of information technology in impersonal and inanimate terms. We enjoy hearing and talking about the power of supercomputers with capabilities approaching one trillion calculations per second. We marvel at the exacting reports that are generated from electronic file cabinets at the click of a mouse. The computational potential being crammed onto fingernail-size chips of silicon is mind-numbing.

Very likely the same feeling of awe swept over the factory workers of a century ago when the Mechanical Age picked up a full head of steam. We wonder what feelings those workers had as the machines got so tremendously large. Today, we're awed by Information Age miracles that are microscopic.

So we often lose sight of the basic premise that these things great and tiny were intended by their inventors to improve the human condition, not to make us feel less significant.

Last week, *Computerworld* and the Smithsonian Institution honored more than a dozen individuals and organizations whose use of information technology reaffirms the correct relationship between man and computer. It is a dog-wagging-the-tail relationship in which man is master of technology for the betterment of humankind, not subjugated and beholden to it.

Simply stated, the *Computerworld* Smithsonian Awards and its search for new heroes moves the spotlight from the gee-whiz of modern machines to the dignified expression of human thought aimed at making our planet a more humane, healthy and cooperative place to live. The actual technology is only a tool.

From out of a very large group of nominees in the education award category, the winner was a program at a small school in Washington, D.C., headed by a young man who uses information technology to achieve major breakthroughs for children with learning disabilities.

From the equally large environmental achievement category, there emerged another small entrant: a company whose winning project is a decision support system that maps out emergency management before any number of natural disasters strike, minimizing the loss of life and property once they do.

And from the media category, whose nominees featured some of the biggest names and companies in media and entertainment, the winner was a nonprofit newspaper — the only four-language, computer-generated newspaper in the country — whose readership is the burgeoning Asian population in San Francisco.

These winners and the others from the third annual awards ceremony, listed on page 89 today, exemplify so much of what is right and what is possible with information technology.

For each of us, they offer a chance to step back from our blinking cursors and partitioned screens and contemplate some greater good to which we all might aspire in our work.

LETTERS TO THE EDITOR

Less regulation

I must take issue with the statements of Rep. Don Ritter [CW, May 6] concerning the need for an industrial policy to spur on the high-definition systems (HDS) effort. Once again, a congressman assumes that Congress can micromanage the economy. It has been proven again and again that Congress is the problem, not the solution. Witness the S&L crisis and the auto industry decline and the multibillion-dollar Synfuels fiasco.

He shows extreme arrogance when he says, ". . . we wouldn't have a computer industry without DOD." So, all good comes from government, and no innovation has ever occurred without congressional mandate, right?

There are some simple answers to the problem of maintaining and growing America's manufacturing base. First, eliminate the capital gains tax. How can we expect anyone to invest in risky technologies, when, if successful, their rewards are taxed away?

Second, in the particular case of HDS, let competition rip in the delivery of cable services by deregulating the communications industry, including letting phone companies build the fiber infrastructure and deliver the services.

David D. Herchenroether
Pittsburgh, Pa.

Employee rights

Regarding "Noncompete may be on way out" [CW, May 20], your readers should be aware that California is one of the few states that has a specific statute dealing with restrictive employment contracts and which prohibits noncompetition covenants in employment contracts.

This statute notwithstanding, a California court, under the guise of equity, will enjoin a former employee from engaging in competition upon a finding of unfair trade practice or unwarranted disclosure of trade secrets.

Second, while courts around the country tend to give minimal protection to customers, this protection is not absolute.

Even if protection is given to present clients, it is not extended to past or potential clients whom the employee had not solicited. The protection given to present customers lasts only as long as it takes for the former employer to re-establish the relationship with a new employee.

The mention of noncompetition agreements and lawyers is a red herring. A lawyer's profession is the only one where post-employment restrictive covenants, other than those concerning retirement benefits, are unenforceable per se. This is based on the premise that courts are only located in specified locations and that clients have the right to retain the lawyer of their choice.

L.J. Kutten
Kutish Publications, Inc.
Devon, Pa.

DBMS confusion

Regarding George Schussel's "Distributed DBMS decisions" [CW, May 6], as a relational database consultant, I feel the article further confuses the already muddled definition of client/server.

I think it improper and misleading to divide DBMSs artificially into client/server and distributed DBMS. One is a specific architecture for implementing applications, while the other is a class of database.

Mr. Schussel incorrectly characterized client/server DBMS as not supporting location transparency. I suspect he meant "in today's products," but even this would have been incorrect. SQLserver, Ingres, Oracle and RDB/VMS are all client/server-architected products supporting varying degrees of location transparency, so it is strange that he chose to cast the last three as "true distributed DBMSs." It's also strange that On-line from Informix did not appear at all and that Oracle appeared twice.

More important, client/server architecture has nothing at all to do with location transparency in the DBMS sense. The idea of client/server is that the developer or system administrator has the option of placing application-specific processing on any platform that can communicate with the server or servers.

Location transparency does not require that a full local DBMS and data dictionary reside on each node. Client-only nodes have no need for a full local DBMS or data dictionary; they need only connect to some DBMS server.

David McGovern
Alternative Technologies
Boulder Creek, Calif.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

Remember Gulliver's experience?

Size is becoming less of an advantage in the computer industry

BY WILLIAM SINES

Size used to be a major advantage for a computer vendor. When you were the biggest vendor in a particular market, you were the font from which all innovations flowed and the automatic choice of customers seeking safety and cost effectiveness. But being big doesn't mean as much as it used to.

While the big computer companies continue to dominate the headlines, the medium-size firms are fast replacing them as the engines driving the high-tech American economy.

This is not a phenomenon confined to the computer industry. Between 1985 and 1990, exports of American manufactured goods rose by more than 80% in volume. Yet only two of the nation's biggest companies significantly increased exports. The rest of the growth — the fastest ever recorded in peacetime America — was contributed by medium-size firms with sales (in 1990 dollars) of between $75 million and $1 billion. Furthermore, at least 75% of America's employment growth since 1975 has taken place in medium-size businesses.

During the past decade or two, medium-size computer companies have also become more competitive and large computer companies less so. The worldwide market for the five largest computer vendors was 85% in 1970, 60% in 1980, and by 1990, it had dropped to 36%.

The secret to medium-size computer companies' success is not hard to understand. They have given the customer what he wanted while the large companies have, in many cases, played an outdated technology game.

The rules that used to govern manufacturing and technology have changed. The old rules were that:

- Each industry had one clearly delineated technology.
- A leading company dominated the industry because it generated nearly all the knowledge needed to advance the technology.
- There was little overlap between industries.

Now, underlying technologies are no longer discrete. They overlap and crisscross each other. No industry or company can be fed out of one technology stream. IBM, for example, simply cannot generate all the software or semiconductor designs that its computers need.

James Torok

Conversely, one technology no longer feeds only one industry. As a result, industry leaders, with the possible exceptions of Intel and Microsoft, are no longer in control of the rate of technological change and are, therefore, less able to extract excessive revenues through the sale of "obsolete" technology.

For over 50 years, superior technology and performance went along with being the biggest in the industry or major market segment. From now on, it will increasingly mean being the "right" size. And, in most cases, this will mean being medium-size. Open systems has changed the equation and can provide IS executives with highly cost-effective alternatives.

Big companies are good at many things, the most prominent of which is institutionalization. The dominant company sets the standards, makes the market and keeps order. The faster the market or technology change, however, the less these companies are able to cope.

The hyperflow of technology, especially in the semiconductor industry, has seriously disrupted the old market order. The small or medium-size companies have consistently reacted more rapidly to technology changes by offering customers more powerful and cost-effective products.

Before the advent of open systems standards, the selection of a smaller vendor put the corporate information manager on the "bleeding edge" of technology. It was a risky choice. The manager had to place bets not only on the success of the vendor but also on the success of the technology.

Standards promise to make the technology choice both easier and safer. The information manager may now rely on the open systems promise, which is: You get better price/performance (due to innovation and competition) and easy portability (due to standards) if the vendor fails to keep its promise.

The big proprietary vendors are not going to disappear. On the contrary, they will probably become larger as the worldwide competitive economy becomes more well-established. The challenge for the big boys will be to learn how to become more competitive despite being big.

This means becoming market-driven. It means organizing the whole business around rapid innovation. It means buying into the open systems movement and forming strategic alliances and partnerships based on industry standards. Most of all, it means recognizing that size is no longer any guarantee of success.

Sines is director of midrange systems and server research at Technology Investment Strategies Corp. in Framingham, Mass.

Honk if you love computer programming

BY WILLIAM LEVINE

The computer has been on the cover of *Time* and has been shilled at the world's most shilled event — the Super Bowl. It has produced gigabytes of junk mail, starred in movies such as *2001* and *War Games* and allowed millions of modem users to get paid for goofing off at home. Still, despite all this exposure, the computer is still not really an institution in this country. Why? Because it has never made it onto bumper stickers.

Look what bumper stickers did for babies in terms of visibility. At the height of the "baby on board" campaign, these three little words elevated babies from the depths of the Zero Population Growth era to the demographic, cultural and lucrative phenomenon they are today.

Before bumper stickers made babies fashionable, there were no movies about talking infants or three infantile men and one baby. There was no gourmet baby food, and disposable diapers weren't being blamed for threatening our ecosystem.

What was done for the baby can be done for the computer. We just need to bump up the computer's Q-factor by placing a requisite number of succinctly obnoxious slogans on the backs of cars.

Serious students of bumper stickery know that there are several genres of bumper stickers. We need to pervade these genres with bytes of wisdom from the computer industry.

Intimations of immortality

One common type deals with presumptuous assertions of immortality. A typical example is Doug MacArthur's enduring advertisement for himself: "Old soldiers never die, they just fade away." For the computer to become a major American institution, we will need to fill highways with slogans such as, "Old programmers never die, they just eternally loop," and "Old computer operators never die, they just remain on downtime."

Another genre is the very suggestive "do it" class of bumper sticker. The "do it" slogan links specific occupational and avocational proficiencies to abilities in extracurricular areas of life. An example of this type is "Lawyers do it to everybody." Binary buddies to this type of slogan would include, "Systems analysts do it by design," and "Structured programmers do it from the top down."

So far, we've discussed humorous bumper stickers, but some motorists tack their political, religious and ecological passions on the back of the car in the form of the "I'm OK, you're not" statement. The most well-known of this social impact type is, "America: Love it or leave it." The logical computer industry version of this somewhat jingoistic statement would be, "America: Log on or log off." Another possible data processing contribution to this broad-based sociopolitical category might be, "Jesus saves, and so does virtual storage."

A popular subset of this kind of serious bumper sticker pits a verb against opposing nouns. We have all spied the favorite of the no-nukes crowd, "Split wood, not atoms." Computing is definitely a serious business, so there are a lot of verb and dueling noun possibilities to choose from. A few are: "Partition data sets, not the Middle East," "Execute JCL, not animals," and "Back up tapes, not Third World dictatorships."

THE COMPUTING INDUSTRY lends itself very well to pithy bumper sticker statements.

Bumper sticker slogans would also give computer professionals a chance to publicly proclaim their computing orientations. Network administrators' foes will probably use the space to proclaim those holding this title "LAN lubbers." Data processors who don't like old-style wandering code will be able to slap on the slogan, "Spaghetti code — go to hell," while traditionalists can counter with "Cobol II — The Next Degeneration." Not-so-user-friendly IS professionals may choose to adorn their vehicles with, "User in trunk."

There are also a number of bumper sticker possibilities that are hard to categorize, but should still qualify as real bumper thumpers. Computing students who went down many wrong logic paths in their introductory courses might want to celebrate a passing grade with, "I survived Basic training." Project leaders who want to hand out mementos of particularly frantic systems development projects might choose to hand out bumper stickers such as "Member: U.S. Olympic four-man kluge team."

Clearly, the computing industry lends itself very well to pithy bumper sticker statements. All that's needed is a little pride and stick-to-itiveness. Once our highways are bumper to bumper with computer advertisements, we might just see a movie called *Look who's interfacing*.

Levine is an IS professional at a financial services company in the Boston area.

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OMG finds brokers

Object Management Group (OMG) has announced two finalists in its Object Request Broker (ORB) request for proposal, and winners **Digital Equipment Corp.** and **Hyperdesk Corp.**, along with **Hewlett-Packard Co., Sun Microsystems, Inc., Object Design** and **NCR Corp.**, have agreed to work on combining their submissions. The ORB is the primary message delivery vehicle in an object-oriented environment. OMG, based in Framingham, Mass., is an international group of systems vendors, software developers and users dedicated to promoting object management in software development.

Targeting midsize to large regional U.S. commercial banking institutions, **Stockholder Systems, Inc.** (SSI), a Nynex Corp. company, and **Stratus Computer, Inc.** announced a funds transfer software system. Called Financial Exchange, the software runs on the Stratus family of fault-tolerant XA 2000 Continuous Processing computers. Sold and supported by SSI, Financial Exchange is available now and runs under the Stratus VOS operating system. It is currently running at the Imperial Bank, a $3 billion commercial bank in Los Angeles.

Users wait for 3600 reality

Despite NCR's boasts, massively parallel processor remains to be proven

ANALYSIS

BY MICHAEL FITZGERALD
CW STAFF

"Promises made, promises delivered."

That's how NCR Corp. introduced its System 3600, a massively parallel processor, four times faster than the fastest conventional mainframes. In reality, the promise has yet to be kept: Both hardware and software exist largely in the minds of NCR employees in its West Coast laboratories, who plan for a December release. All NCR did in front of some 120 corporate users at New York's Public Library last month was tell them they could now order one, to the tune of at least $850,000.

Some users said they eagerly anticipate the 3600, a mainframe-class machine based on a scalable, massively parallel computing architecture with up to 288 microprocessors.

"I'm bullish on the whole concept of massively parallel computing," said David Karlson, vice president of MIS at Troy, Mich.-based K Mart Corp., which has invested heavily in Teradata Corp.'s parallel processing database computers, the basis for a significant piece of NCR's System 3600. But Karlson tempered his enthusiasm, saying, "The engineering problems [NCR faces] are severe."

NCR plans to combine Teradata's database engine, based on up to 32 application module processors, each with a 33-MHz Intel Corp. I486 chip, with up to 32 application processors, each with two to eight 50-MHz I486 chips for up to 288 processors. It is a tall order for any company. Most think NCR can meet its goals, although some analysts said they think it will miss its deadline on the 3600.

"There's no doubt they've got the technical talent," said Omri Serlin, head of Itom International Co. in Los Altos, Calif. But Serlin says NCR has a spotty track record with its technological development: success with the small computer systems interface, and a bust with its 9800 mainframe line. He said he wants to see the product before he predicts success, at least in NCR's ambitious development schedule.

At a glance

NCR Corp.'s System 3600 will need some new software when it arrives later this year

NCR

- **Introduced:** May 1991.
- **Delivery:** Due in fourth-quarter 1991.
- **Architecture:** Unix-based parallel processor designed to run up to 288 Intel Corp. I486 chips.
- **Price range:** $855,000 to $8 million.
- **Target market:** Large transaction processing operations.
- **Challenges:** To overcome software shortage.

CW Chart: Doreen St. John

While the challenges presented by the hardware could stagger NCR, the software is the true concern for users such as Karlson. NCR has to develop a multiprocessing version of Unix System V Version 4, and it is unclear that it will succeed in doing this, particularly by the fall.

"It's one thing to talk about a multiprocessor Unix for several processors, but when you talk about hundreds or thousands of processors, the environment gets a little more tricky," Karlson said.

NCR also must adapt Teradata's proprietary language to run in Unix, which could present some tricks, and the company

Continued on page 32

IBM puts off object-oriented support

BY ROSEMARY HAMILTON
CW STAFF

IBM will postpone its scheduled announcement of support for object-oriented technology in AD/Cycle until later this year, a company executive said recently.

IBM had planned to announce by the end of this month support for the Digitalk Smalltalk language in its strategic software development environment.

When it does make the announcement, IBM said, it will also provide a more substantial statement of direction for AD/Cycle and object-oriented languages as well as methodologies.

"This is not really a delay," said Cliff Reeves, IBM's manager of Common User Access, who also has responsibility for object-oriented technology in AD/Cycle. "We want to do it in concert with other announcements."

In November 1990, Reeves outlined IBM's object-oriented projects, which focus on several areas, including software development, databases and IBM internal development. At that time, Reeves said IBM would begin work in 1991 to bring object-oriented approaches and methods to AD/Cycle and would announce by June 1991 support for at least one object-oriented language in AD/Cycle.

Recently, IBM determined it would make more sense to address the larger issue of object-oriented technology as it relates to AD/Cycle instead of announcing only language support, Reeves said.

Whole focus

The AD/Cycle announcement will focus more on how object-oriented technology will affect the whole development life cycle, "rather than on an individual product," Reeves said.

Paul Hessinger, chief technology officer at the Computer Task Group, Inc., said he expects the announcement to be "more of a description of [IBM's] intent with the object-oriented area, as opposed to any sort of breakthrough."

IBM still plans to include Smalltalk in AD/ Cycle and will also recognize C++ as an AD/ Cycle language, Reeves said.

Reeves explained this postponement following an announcement earlier this month that IBM had joined Object Management Group (OMG), an industry association established to promote standards for object-oriented technology.

Reeves said he was "really pleased" that IBM had joined OMG. He said the membership will give IBM the chance to "influence and be influenced" by the future of object-oriented technology.

The company is moving ahead with plans to bring object-oriented technology to existing IBM databases, although he could not provide a time frame, Reeves said.

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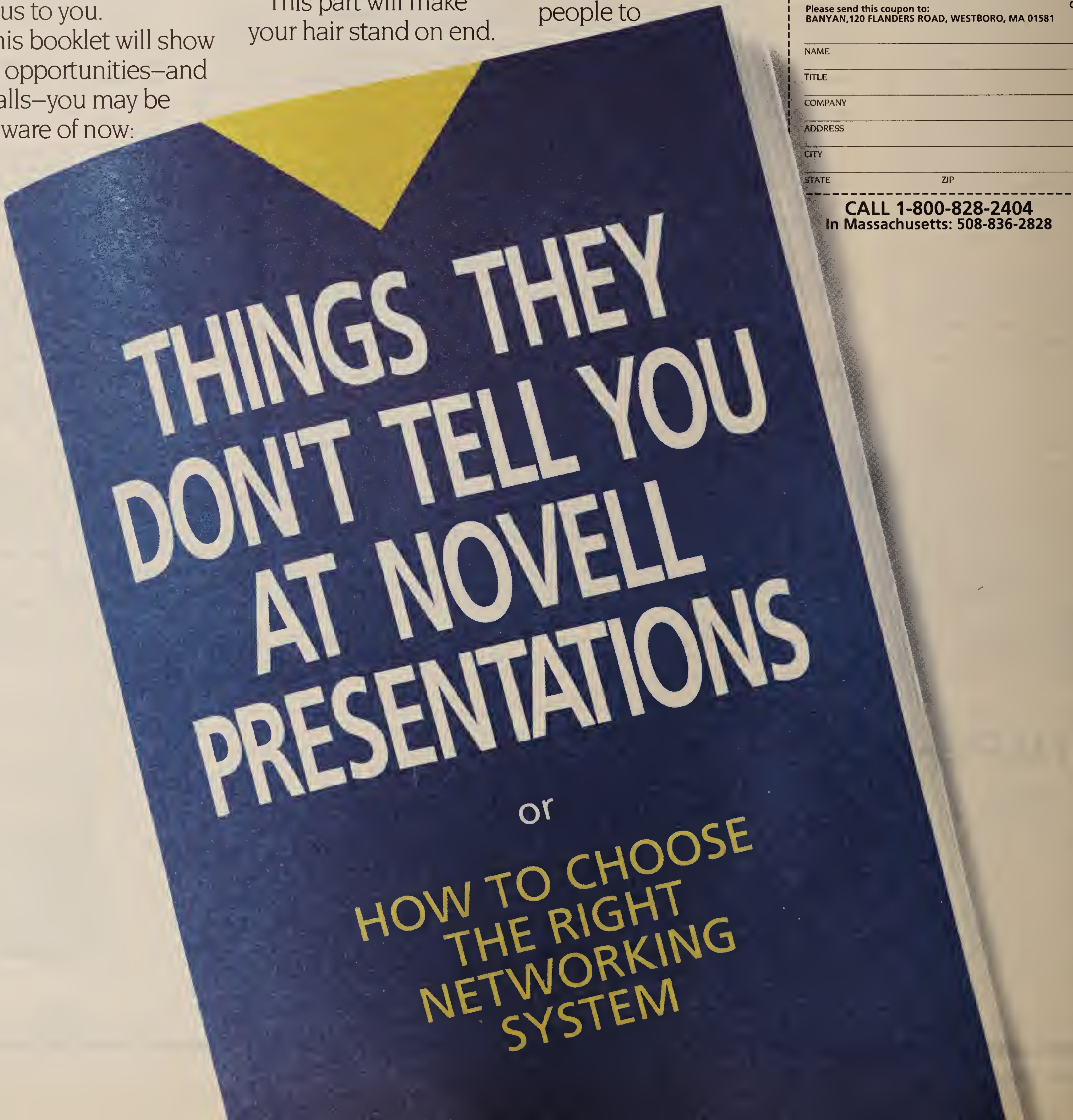
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DEC attempts new open systems feats

BY MARYFRAN JOHNSON
CW STAFF

Like a nervous audience watching a high-wire artist perform above a net full of holes, Digital Equipment Corp. customers are awaiting the next moves in DEC's open systems campaign with anxiety and anticipation.

The following are some of the gaps that users and analysts have spotted in DEC's strategy:

- The perception that the proprietary VAX/VMS line is changing too slowly to catch up with a market hurtling toward reduced instruction set computing (RISC).

"The big question for DEC is this migration to the RISC-based Alpha VAX," said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass. "Hewlett-Packard [Co.] did the same kind of transition, but it took them forever, and DEC ate their lunch in the meantime. This could be payback time."

- The daunting, ground-breaking task of turning a minicomputer vendor into a software/systems/network integrator.
- The knowledge that the firm's shaky profitability still leans heavily on high-margin VAXs.
- The common view that DEC's marketing efforts are inept.

"We haven't explained our 'Open Advantage' very clearly," Peter Smith, vice president of DEC marketing, admitted recently. "Customers have little patience for any computer company that is not open."

Some users are also running out of patience with the struggle over standards. "I get a little upset with these vendor-oriented standards committees forming on the fly," said Gordon Brazas, director of telecommunications at Kellogg Co. in Battle Creek, Mich. "How much is making statements, and how much real work is going on?"

All eyes on DEC

Some signposts to watch for as DEC journeys toward open systems:

- New software and services popping up on other vendors' platforms, culminating in Decworld 1992 with its Open Advantage theme.
- Emphasis on DEC's abilities as a systems and network integrator. A buzzword will be "Advantage-Networks," DEC's newly christened networking software.
- Greater visibility for Network Application Support, or NAS, DEC's broader, multivendor version of IBM's Systems Application Architecture.
- An escalating campaign for industry standards — or DEC standards adopted as such — focused on those blessed by the Open Software Foundation, X/Open Consortium and International Standards Organization.

Kellogg is approaching the open systems question by conducting its own technology study, calling in several computer vendors to make their pitch for open systems.

"Our struggle as a company is trying to decide which direction to go," Brazas said. "The ideal would be plug-and-play networks with any type of hardware, regardless of the vendor."

Analysts say DEC's true motivation in opening VMS with industry-standard Posix-compliant interfaces is to preserve VMS as an alternative for open systems buyers.

"DEC's heart is in the right place," said Peter Schay, an analyst at Gartner Group, Inc. in Stamford, Conn. "We tell our clients looking at what open systems strategy they should have that DEC ought to be on their short list."

Bluestein said many customers already see DEC as more open these days in light of the firm's Posix compliance, its active participation in the Open Software Foundation and its newfound willingness to license products — including the Ultrix operating system and Decnet source code — to other vendors.

Another example of real change at DEC is its aggressive approach to software now that hardware margins are collapsing. David Stone, the vice president who runs DEC's software business, stresses how he plans to make a lot of money selling software on other vendor's platforms.

In addition to products running on MS-DOS and Apple Computer, Inc. Macintoshes, DEC has introduced Decwindows Motif and the Visual User Interface Tool for Sparcstations from Sun Microsystems, Inc.

Getting some Sun

"The Sun tools are a harbinger of this change of strategy from using software to make VAXs more attractive to making money on the software itself," Schay explained. "That's going to bring about a whole lot of openness that we've never seen from DEC before."

John Donovan, chairman of Cambridge Technology Group, an executive education and consulting firm in Cambridge, Mass., said, "DEC could lead the country in this open systems advantage, but they have a window of one to two years before they'll no longer be a player."

Donovan argued that DEC cannot make VMS a true open operating system by attaching Posix-compliant modules on future versions. "That's like saying you're going to standardize on the English language but still allow everyone to speak French," he said. "If you declare yourself an open systems vendor, you really have to be one."

Storage keeps up with Dialog growth

ON SITE

BY JEAN S. BOZMAN
CW STAFF

PALO ALTO, Calif. — If disk drive technology were not getting denser all the time, on-line database provider Dialog Information Services, Inc. would have outgrown its 12,000-sq-ft computer room a long time ago.

Fortunately for the 20-year-old firm, the dramatic increase in the amount of data that can be placed on a single disk drive has helped in its move toward replacing many of its indexed abstracts with full-text versions of newspaper articles, scientific documents and legal treatises.

"We now have 1.3T bytes of information on-line," said Robert Feinstein, manager of Dialog's data center here, "and it's in the same space as the 270G bytes we had on our IBM 3350 drives six years ago."

Dialog is adding 20G to 40G bytes of storage per month, with no end in sight, Feinstein said. Historically, Dialog has doubled its disk drive capacity every three years. The data center now has four strings of Hitachi Data Systems Corp. (HDS) 7390 disk drives, totaling 240G bytes of capacity. In addition, Dialog has more than 1T byte of capacity on 34 strings of HDS 7380 Model K and Model E drives.

The on-line database service has 120,000 customers worldwide. Among them are 1,300 U.S. government agencies, 5,000 schools and universities and scores of the world's largest industrial corporations.

New frontiers

Dialog is looking to expand its business. It is in the process of adding image databases such as those that store molecular structures for chemical firms, greatly boosting the Dialog system's storage requirements. The new services are intended to compete with database services provided by Dow Jones & Co., Inc. and Mead Data Corp.

"The customers have an expectation of having access to the data in seconds, since they're paying for the computer time," said Gordon Schick, vice president of systems and operations at Dialog.

"It's called instant gratification," said Roger Summit, Dialog's chief executive officer and founder. "People want access to the on-line files right away rather than accessing an abstract first and then sending a request for an article to a fulfillment house."

Users' data searches are guided by Dialog-proprietary commands that navigate the stored indexes. Dialog-specific indexing algorithms developed here speed on-line searches; other algorithms compress data storage into as little disk drive space as possible.

Dialog's computer room here is dominated by two HDS EX 100 mainframes and has been using HDS disk drives since 1986. Dozens of IBM-compatible tape drives and tape cartridge drives are used to archive copies of Dialog's 400-plus databases for safe-keeping. An Amdahl Corp. 4705 front-end controller routes inbound modem requests from X.25 packet-switched networks, including Tymnet and Telenet, to the HDS mainframes.

Since many information providers send in tape reels and cartridges filled with data, there is a continual need to rewrite entire databases — in some cases, several times per day. This can cause scheduling problems.

"We're reloading 50% of our storage capacity every time we update, and our average update cycle for any one database ranges from 10 days to two weeks," Summit said. Some databases are updated often, including four databases that are updated several times per day.

Even these elaborate storage facilities will be strained by future subscriber demands, Schick predicted. In time, Dialog will probably be forced to expand its computer room facilities, possibly moving into larger quarters in an adjoining building. The firm is also contemplating the construction of a second data processing facility on the East Coast, in part to ensure disaster recovery capability, Summit said.

Cindy Charles

Dialog's CEO Roger Summit (right) *and Vice President of Systems and Operations Gordon Schick with Hitachi mainframe*

One way to grow the mainframe system here would be to upgrade from the current IBM VM/CMS system to IBM's VM/XA, Feinstein said, allowing the two HDS mainframes to serve as a four-way "quad" processor. The system is in operation nearly all of the time except for several hours of planned maintenance on weekends. Dialog's VM/CMS processing is boosted by the use of IBM's High Performance Option 5.0, Feinstein said.

New technologies will also offer some alternatives to the current computer room dilemma, Dialog executives said. Schick is looking into new storage options, such as redundant arrays of inexpensive disks technology, that would make Dialog's disk drives smaller in size.

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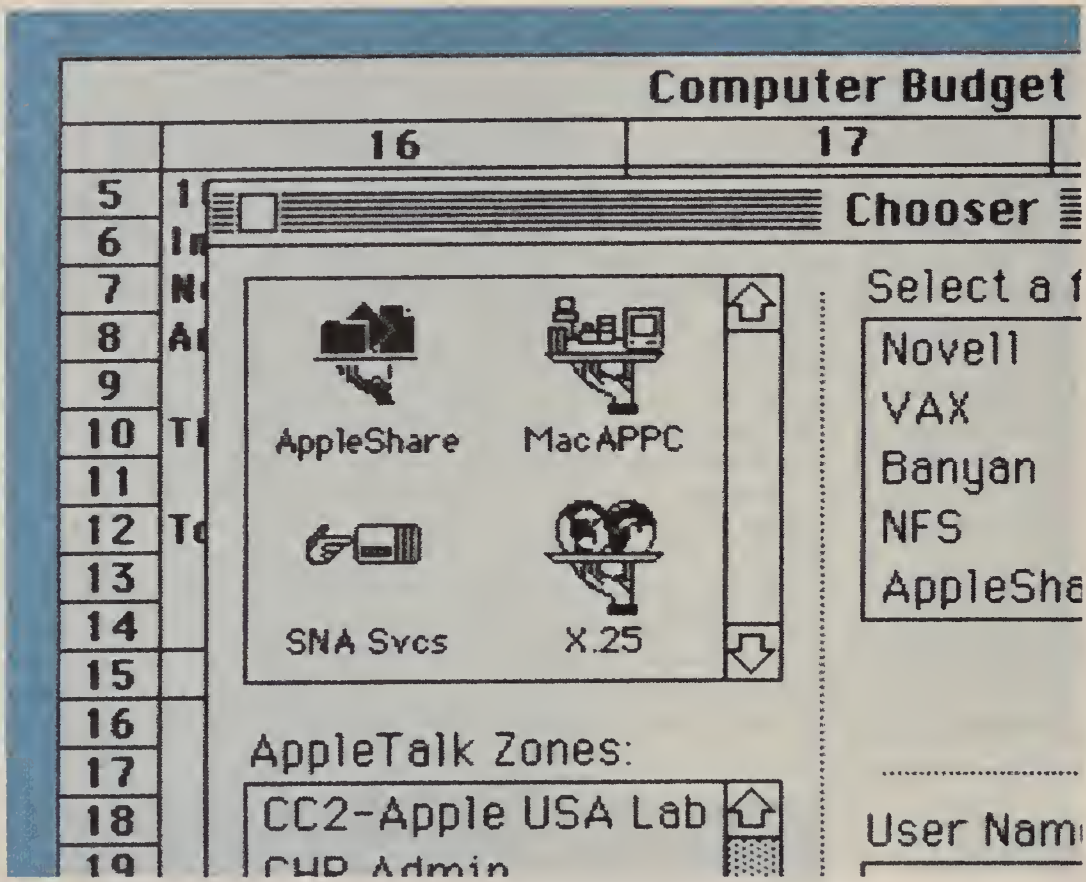

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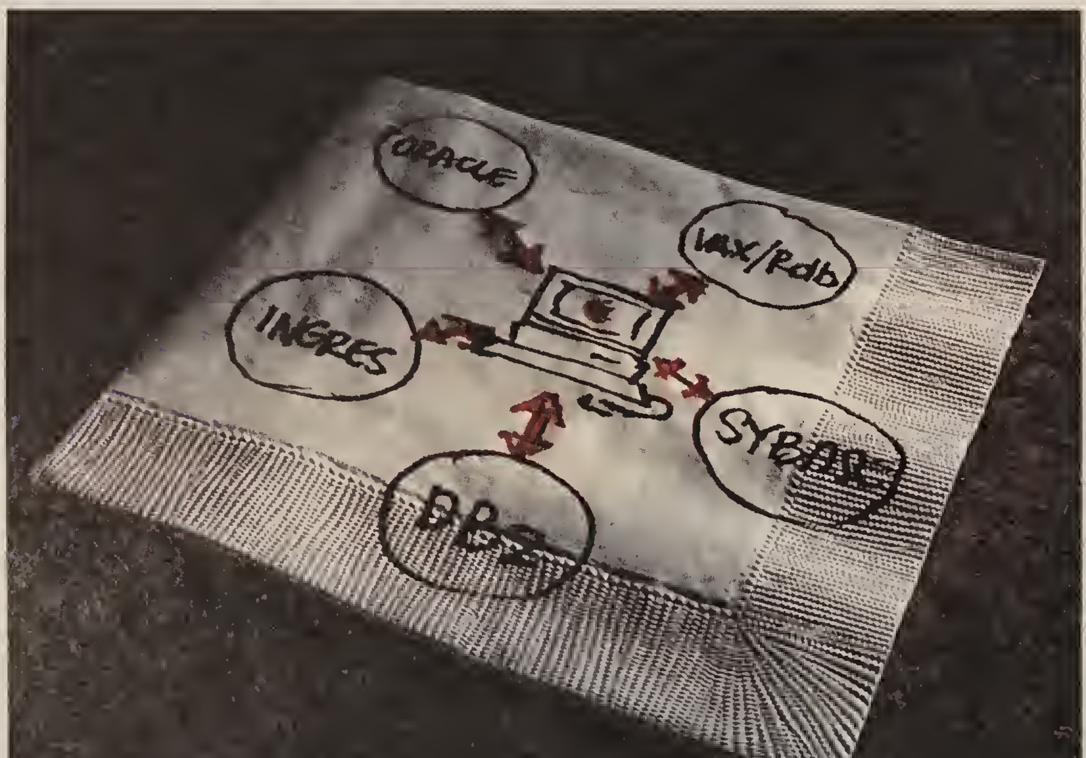

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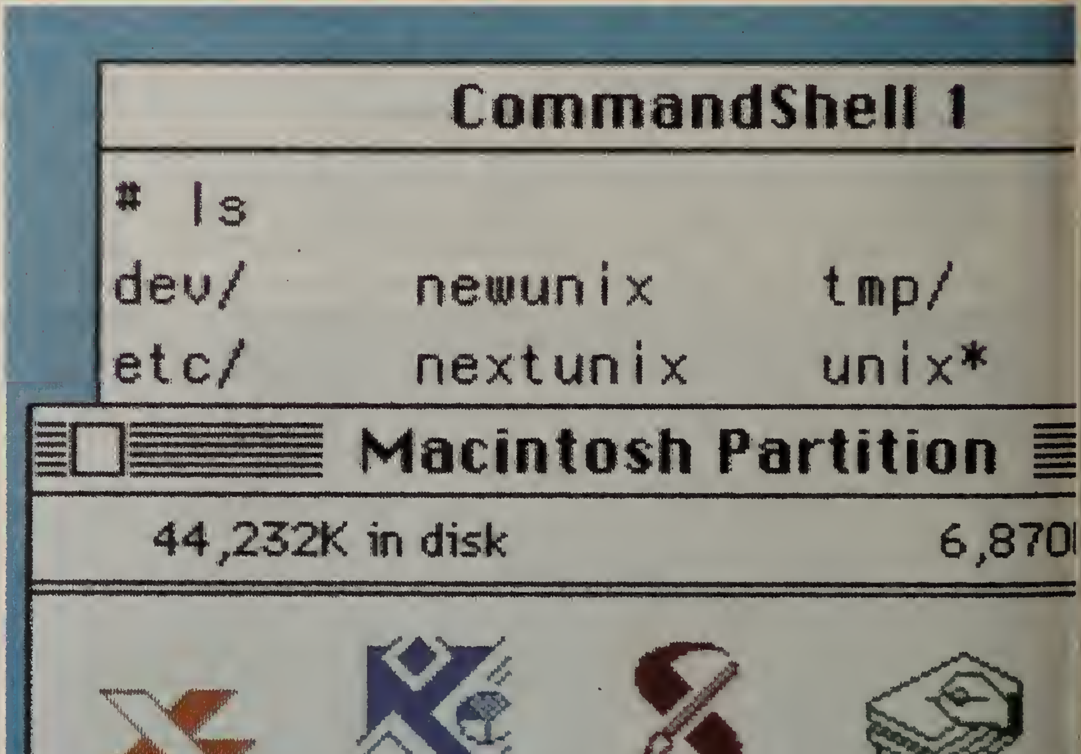

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etc/      nextunix    unix*
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Encore releases duo of low- and high-end products

BY SALLY CUSACK
CW STAFF

FT. LAUDERDALE, Fla. — Playing to both ends of its customer base, Encore Computer Corp. has expanded its line of Motorola, Inc. 88000-based real-time systems with two product offerings.

At the low end, the vendor rolled out the RSX System, a reduced instruction set computing (RISC)-based processor with dual operating modes for both native RISC and Encore's existing Concept/32.

Positioned as a bridge for moving Concept/32 users toward RISC technology, the RSX provides up to 16M bytes of cache memory; as many as eight RSX nodes can be connected in a cache-coherent manner to form a cluster.

Up to eight clusters can be connected via Encore's Fiber Optic Reflective Memory Systems.

Targeting high-end on-line transaction processor (OLTP) applications, the vendor unveiled the Encore 93 series, which can be configured with four to 32 Motorola 88000 RISC processors.

The system features a multithreaded real-time Unix operating system and delivers more than 5000 Digital Equipment Corp. VAX millions of instructions per second, according to the vendor.

Some enthusiasm for the clustering capabilities of the new systems was expressed by William W. Sines, director of midrange systems and server research at Technology Investment Strategies Corp., a research and consulting firm in Framingham, Mass. However, Sines said he also had concerns as to the vendor's chance of success in the OLTP market.

"They just don't have the sales and marketing in place to compete directly with companies like Harris Corp.," Sines said. "Their strength will continue to be in a real-time niche market."

Pricing on the RSX ranges from $149,400 to $249,900, depending on options selected. Upgrades to existing Encore systems begin at $99,500 and are expected to begin shipping this month.

Pricing for the Encore 93 series begins at $159,900, with volume shipments scheduled for the fourth quarter of 1991.

Real-time Unix OS for Sun, HP

BY J. A. SAVAGE
CW STAFF

LOS GATOS, Calif. — A simulated Unix operating system from Lynx Real-Time Systems, Inc. is being readied for Hewlett-Packard Co.'s and Sun Microsystems, Inc.'s reduced instruction set computing (RISC) platforms.

The operating system will run on Sun's Sparcstation 2s and will be compatible with all Scalable Processor Architecture applications for Sun's operating system V Release 4, according to a Sun spokeswoman. System V Release 4 has yet to be generally available; the spokeswoman said it should be available by early 1992.

Lynx will also run on HP's RISC machines. HP currently has a 20-year-old real-time architecture in its HP 1000 family but has said that new real-time systems from the company will be based on open systems standards, according to David Fastenau, product marketing manager for HP's data systems operations.

Unix is geared to multitasking, which does not accept the interrupt scheduling needed for real-time operations, according to Inder Singh, president and chief executive officer of Lynx. "If you're controlling a missile and it's off course, you have to correct it within milliseconds. In a normal Unix operating system, it would have to finish another system call before correcting the course, which could be too late," Singh said.

Lynx is able to get around the limitations of Unix by avoiding the Unix kernel altogether, according to Singh. The company instead simulates Unix through reverse engineering.

Real-time operating systems suffer from lack of applications, he added. "There are very few standard applications. It's like the MIS world before [IBM's] 360 came on the scene."

Lynx has been available on Mips Computer Systems, Inc.'s architecture through Control Data Corp. and on Motorola, Inc.'s 88000 chip through Data General Corp. Singh said he expects the Sun and HP moves to help spur real-time standardization.

"The only real standard is Posix.4, and that's still in draft form," Singh said. Lynx has adopted Posix.4 and the established Posix.1 interfaces.

3600

CONTINUED FROM PAGE 27

must release its Top End transaction processor, due for general availability in September.

What has users interested in the development process is the 3600's price/performance potential. NCR said the initial System 3600 models will generate a claimed 2,000 million instructions per second (MIPS), at one-tenth the cost per MIPS of an IBM mainframe ($5,000 per MIPS, as opposed to $50,000 or more).

NCR said 1992 systems will offer 10,000 MIPS and will be capable of processing 1,200 transactions per second. The benchmarks for the nonexistent machine are taken from the ratings of current Teradata products running in combination with the 50-MHz chips.

Serlin pointed out that benchmarks tend to reflect peak performance possibilities under ideal circumstances, and actual performance almost never equals benchmark possibilities.

He added that NCR could create a machine significantly faster than a typical mainframe. The problem, he said, would be its level of efficiency.

These numbers create visions of completely new and more powerful applications than exist today.

"When you can put that kind of computing power coming out of a multiprocessor-based system, it's a tremendous opportunity," said David Evans, vice president of IS at J. C. Penney Co. in Dallas. "It's going to change the way we do things in ways we don't know yet," he added.

Unanswered questions

However, the question marks remain, and the ongoing merger with AT&T's Computer Systems Division raises more, particularly since the division has had some success selling its high-end parallel processor, the System 7000, which AT&T resells from Pyramid Technology Corp.

James E. Clark, vice president of high-performance and fault-tolerant systems at the Computer Systems Division, said the 7000 will not compete with the 3600. In short, the System 3600 has promise, but people want to see the reality.

Maximum server for RS/6000s

Maximum Strategy, Inc. in San Jose, Calif., last week introduced a high-performance storage system for IBM RISC System/6000 workstations that provides scientific and technical users with supercomputing capabilities, according to the vendor.

The Strategy RS/6000 RAID (redundant arrays of inexpensive disks) Storage Server will be marketed by Maximum Strategy and IBM and will allow the RS/6000 to run storage-intensive applications usually reserved for supercomputers and minisupercomputers.

The server, available in mid-July at configurations priced from $112,000, uses as many as 40 5¼-in. hard disk drives and delivers an 18M byte/sec. sustained data transfer rate and up to 43.2G bytes of data storage capacity.

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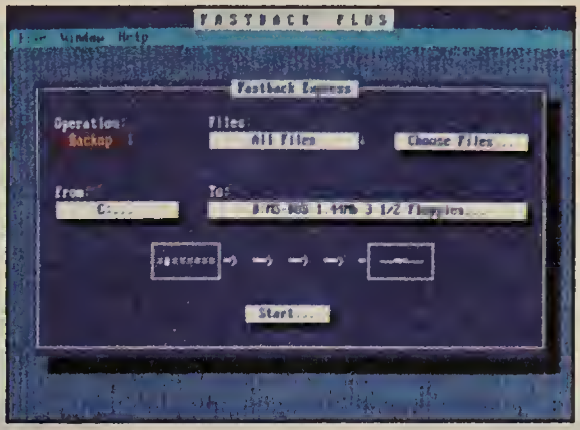

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X Window System gets a boost from vendor rollout

BY JOANIE M. WEXLER
CW STAFF

At the recent Xhibition '91 conference in San Jose, Calif., several vendors of X Window System products introduced and enhanced their offerings.

X is a public-domain protocol that is installed on intelligent terminals, personal computers and workstations to let users pull information from multiple hosts and view it simultaneously in separate windows on one screen.

- NCR Corp.'s Applied Digital Data Systems subsidiary rolled out color X terminals that bundle a local window manager and graphical user interface. They are also driven by a Texas Instruments, Inc. TMS34020 processor that NCR says boosts the performance of its existing terminals by 2.5 times.
- Network Computing Devices, Inc. demonstrated font server software slated to be a feature in the next version of the X Consortium's standard version of the X protocol. The font software aims to standardize font formats in different vendors' equipment so that applications can be displayed in a consistent way.
- IXI Ltd. announced general availability of X.Desktop 3 — its object-oriented "drag and drop" graphical environment — for Sun Microsystems, Inc., Digital Equipment Corp. and Hewlett-Packard Co. hardware platforms. The new version supports the dragging of data as objects between the desktop and other applications.
- Tektronix, Inc. added networking, security and interface enhancements to its Tekxpress family, including Motif, Simple Network Management Protocol, Local Area Transport and Serial Line Internet Protocol support.
- Silicon Graphics, Inc. has integrated the X protocol and its graphics application programming interface into its new Irix 4.0 operating system, reportedly providing a real-time three-dimensional X networking environment.
- Visionware Ltd.'s Xvision 4.0 is said to integrate a copy protection scheme to guard against software piracy.

Unix software products refined

BY JOHANNA AMBROSIO
CW STAFF

Two archrivals in the Unix software-development market have introduced new components of their respective systems while taking very different tacks.

Interactive Development Environments, Inc. (IDE) in San Francisco added reverse engineering and code generation to its C Development Environment and simplified querying the repository and navigating through the various modules.

Cadre Technologies, Inc. in Providence, R.I., enhanced its Teamwork software-development system with a tool that produces automated test cases to make testing software easier.

Tests added

"Testing has been ignored," said Ted Gary, director of marketing. "Although the debug and testing phase accounts for more than 50% of the entire development time, our studies show that only 40% of shops have standards for testing software, and only half of them really enforce those standards."

Cadre's Teamwork/Testcase generates reusable test cases for virtually every phase of software design, Gary added. Testcase is based on T, a test-case generation tool developed by Programming Environments, Inc. in Tinton Falls, N.J.

With Testcase, users can produce test cases for modules under development, integration between modules and the entire system. Testcase uses different kinds of analysis techniques and explains why it chooses a certain type of test set.

Testcase will be available in August on the Sun Microsystems, Inc. Sparcstation and in the fourth quarter on other workstations, including IBM's RISC System/6000 and the Sun 3. Prices begin at $9,995, according to Cadre.

Easier code development

For its part, IDE's C Development Environment, initially introduced in September 1990, has been enhanced with a reverse-engineering component and the ability to generate source code. Previously, developers could use IDE's Software Through Pictures, a visually oriented tool to develop software.

Geoff Salinger, assistant director of systems development at the Federal National Mortgage Association in Washington, D.C., said he is "looking forward to developers being able to develop code however they're comfortable. Software developers are independent and generally don't like to be told how to do things."

With the reverse-engineering and code design modules, existing source code can be engineered into designs, and new source code can be generated from those designs.

Also, consistency is now promised throughout the development process — if developers change the design, the code will reflect those changes, and vice versa.

The Code Generator and the reverse-engineering module, called the Design Generator, will be available in August on the Sun Sparcstation; versions for other workstations, including those from IBM and Hewlett-Packard Co., will be available by the end of the year. The Design Generator is priced at $6,000, and the Code Generator is priced at $3,000.

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NEW PRODUCTS — SOFTWARE

Utilities

MB Solutions, Inc. has created JCL/Convert, software that aids job control language (JCL) consolidations and conversions.

JCL/Convert includes the capabilities of the company's JCL/Cross-Reference and PDS/Manager products. It allows users to identify, document and systematically alter JCL-related data elements such as job, file, program and procedure, the company said.

An average system configuration costs $11,000.

MB Solutions
56 Steele St.
Denver, Colo. 80206
(303) 321-2205

SYSB-II, a product of H&W Computer Systems, Inc., allows CICS VSAM files to be simultaneously updated by on-line applications and batch programs.

The product maps batch updates transparently to CICS without source code alterations, according to the company. Batch changes can thus be journaled along with on-line updates.

SYSB-II is priced between $10,000 and $40,000, depending on processor group.

H&W Computer Systems
3166 Elder St.
Boise, Idaho 83715
(208) 385-0336

Database management systems

Cognos, Inc. has released its Powerhouse 4GL and Powerhouse Starbase relational database management system for Digital Equipment Corp.'s Ultrix platform.

The products retain the look and feel of the VMS environment versions, according to the company. Software generated by Powerhouse can be ported between VMS and Ultrix environments with only minor revisions.

The Ultrix version of each product costs $5,900 to $200,000, depending on hardware platform.

Cognos
67 S. Bedford St.
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Computer-aided software engineering

Iconix Software Engineering, Inc. has announced a version of its Freeflow computer-aided software engineering (CASE) tool for Sun Microsystems, Inc. workstations.

Freeflow is a structured analysis tool incorporating a data dictionary and repository. The product runs under the X Window/Motif interface, according to the company.

Freeflow is one of of nine modules in the Powertools CASE line; the company reported that it will port all modules to the Sun platform.

The product costs $995.

Iconix Software
Engineering
Suite 320
2800 28th St.
Santa Monica, Calif. 90405
(213) 458-0092

HARDWARE

I/O devices

Bit 3 Computer Corp. has announced the Model 465 Sbus to Q22-bus Adaptor, an adaptor that makes it possible for Scalable Processor Architecture workstations to use Q22 bus-based boards.

The Model 465 Adaptor comprises two connected cards. It allows Q22 bus I/O to be directly addressed as Sbus I/O and up to 4M bytes of Q22 bus memory address space to appear as Sbus memory.

Cables connecting the two cards are available up to 25 ft. in length.

The product is priced at $2,695.

Bit 3
8120 Penn Ave. South
Minneapolis, Minn. 55431
(612) 881-6955

Data storage

Qstar Technologies, Inc. has developed a line of rewritable optical storage subsystems for the IBM RISC System/6000 workstation platform.

The R650M subsystem consists of one 650M-byte drive and file system software. It is priced at $5,495.

Jukebox configurations offer a range of storage capacity from 10G bytes ($24,995) to 93G bytes ($88,995).

Qstar Technologies
Suite 202
6707 Democracy Blvd.
Bethesda, Md. 20817
(301) 564-6006

Winchester Systems, Inc. has announced Flashcluster, a product connecting small and mid-size Digital Equipment Corp. VAX systems with high-performance storage subsystems.

Up to six central processors can share storage systems via the Flashcluster's 10M byte/sec. small computer systems interface (SCSI) bus, according to the vendor.

The Flashbus can be extended to a length of 80 ft. Host adapters for BI-bus, Q-bus, Unibus and 3100 SCSI-bus CPUs are available.

Pricing starts at $7,995 with a 780M-byte disk drive included.

Winchester Systems
400 W. Cummings Park
Woburn, Mass. 01801
(617) 933-8500

Winchester Systems' *Flashcluster permits four CPUs to share 28 disk and tape devices*

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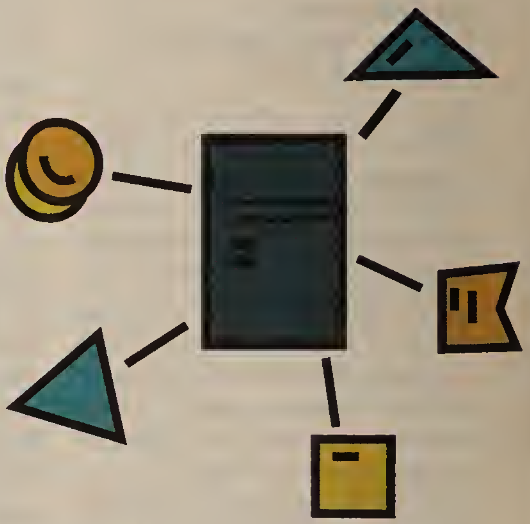
IDC Study on UNIX OLTP

UNIX On-Line Transaction Processing at Multi-User UNIX Sites (January 1991) states that some 47.4% of sites running commercial applications on multi-user UNIX systems are running OLTP. The study reports that Informix is in use at more sites than any other DBMS for UNIX OLTP applications.

About the TPC

The Transaction Processing Performance Council (TPC) was founded in 1988 to define transaction processing benchmarks and to provide performance data to the industry. Today, 40 hardware and software vendors, including AT&T, Bull, Sybase, Data General, DEC, ASK/Ingres, Fujitsu, IBM, Informix, Hewlett-Packard, NCR, Olivetti, Oracle, Pyramid, Sequent, Siemens, Sun, and Unisys are members.



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The TP1 benchmark is no longer the accepted benchmark for measuring database performance. The new TPC tests establish more complete, thorough specifications than TP1, leading to more objective, verifiable results for comparing performance between hardware systems and software products. TPC Benchmark™ A measures OLTP processing performance. TPC Benchmark™ B—similiar to a batch test—focuses on database throughput.

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COMMENTARY

Patricia Keefe

Vendor vignettes

OK, OS/2 groupies. The word at Comdex/Spring '91 was that IBM has cast in iron a mid-fall ship date for OS/2 2.0, with "early final" code going out to users in August. New OS/2 development partner Micrografx reports that its work for IBM is coming along fine. Meanwhile, Microsoft is telling its accounts to expect the 32-bit Windows, also called Windows 4.0, sometime in mid-'92. Microsoft says the developer's kit is supposed to ship by the end of this year, but as one user commented, "Those guys are always six months off."

Once burned, twice shy. Every week, it seems, reveals yet another crack in the tottering IBM/Microsoft partnership. One obvious outcome of this is IBM's refusal to commit to Microsoft's portable OS/2 development project, New Technology OS/2. IBM's admission that it is looking at alternatives could once again leave developers in a quandary, wondering which way to go.

Now you might think that all of those developers who chose OS/2 over Windows might just be more inclined to pick New

Continued on page 43

Support changes accompany System 7

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Early adopters of Apple Computer, Inc.'s System 7 may feel encircled by the whirlwind of installation and maintenance questions such a major upgrade typically engenders, but Apple promises that help is on the way.

This week, Apple will deliver two key System 7 support packages that should go a long way in taking the guesswork out of maneuvering through the new operating system. The arrival of the subscription services is part of the guiding edict of Apple Vice President of Customer Service Morris Taradalsky, who thinks Apple should pay as much attention to delivering outstanding customer service as it does to creating products.

"Performance is clearly important, but it's not the only concern," he said. His mission is "pulling all the pieces together and getting the job done."

Positive response

Apple users are pleased with the aggressive approach the firm is taking to smooth the rough spots of System 7 assimilation. "I'm hoping [the upgrade] won't be difficult and we won't even need any support, but it's good to know that they're not letting us go out on a limb if we do run into trouble," said Barry Eisenberg, senior management systems analyst at Hughes Ground Systems Group in Fullerton, Calif.

Several levels of service and support will be offered. An in-the-box training program accompanies each System 7 upgrade kit, and Apple provides 90 days of toll-free support calls with the $99 Personal Upgrade edition and 180 days with the $349 Group Upgrade package.

Apple has also established an automated question-and-answer system that lets callers listen to recorded answers to frequently asked questions about System 7 upgrades.

Apple's subscription support services are the likely next step beyond the automated system, starting with the Technical Coordinator Answerline (TCA), which is designed for institutional customers. The TCA is intended for help desk and networking support staffs of large customers. Subscribers have direct access to Apple support engineers, who provide assistance with configuring, installing, administering and other troubleshooting. Multivendor networking support will also be provided.

A one-year TCA subscription with unlimited use sells for $1,995. An edition that limits users to six calls per year sells for $495. Current subscribers to Apple N&C Answerline will be automatically upgraded to TCA.

Help for developers

Customers in the midst of elaborate in-house software development projects under System 7 are the target of the Software Development Answerline (SDA). Subscribers receive access via the Applelink electronic mail system. Apple development support engineers can provide information regarding operating system, graphical interface/front ends, languages, tools, utilities, connectivity and selected third-party products.

A one-year subscription to the SDA service with unlimited use will sell for $5,995, while a limited six-call package sells for $1,795. The service can also be ordered by calling (800) 950-2442. Questions may be submitted via Applelink at any time but will be responded to during regular working hours.

Institutional customers can also look forward to a 1992 service thrust that will provide more in-house software development, networking setup support, phone-in lines and on-line services. Next year, the company plans to introduce an instantaneous on-line ordering system.

CASE users are stuck on DOS, study reveals

BY RICHARD PASTORE
CW STAFF

Users of computer-aided software engineering (CASE) tools are principally relying on the Personal Computer-DOS operating environment and do not seem in any hurry to change, according to a study of CASE users released by Datapro Information Services Group last month.

Of the 102 users surveyed, 67% are currently running CASE tools in a PC-DOS environment. That is a margin of 2 to 1 over the next most prevalent operating environment, OS/2. Next year, 64% will continue to run under DOS, the survey showed.

CASE users' migration to OS/2 appears to be happening at a slower pace than industry pundits predicted, Delran, N.J.-based Datapro said. But next year, another 10% of the survey respondents said they intend to move to the operating system, bringing its share up to 46%.

DOS is the favored environment among finance, banking and professional services users, while computer and communications vendors more often choose Unix.

Besides PC-DOS, the other operating system that is expected to lose users will be IBM's MVS/VM, down by 2% to 30% of the surveyed population. Other operating environments represented in the survey include Unix (22%), Digital Equipment Corp.'s VMS (19%), Apple Computer, Inc.'s Macintosh OS (12%), Mainframe DOS (9%) and others (18%).

JULY 1991

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COMPUTERWORLD

The Newsweekly of Information Systems Management

Foes rise to meet Visual Basic

BY PATRICIA KEEFE
CW STAFF

Microsoft Corp.'s Visual Basic for Windows 3.0 had barely set foot under the spotlight before two competitors rushed the stage.

Within Technologies, Inc., a small development house with a core of former Microsoft employees, is already collecting accolades from some industry observers who say its Realizer applications generator will upstage Visual Basic, which was announced last month.

Hovering by the footlights is GFA Software Technologies, Inc., USA. The Salem, Mass.-based developer has ported its DOS-based GFA-Basic applications generator to Windows 3.0.

Both companies claim to offer a faster, more in-depth programming environment. The competition can only be good for developers currently struggling with programming for the often-difficult Windows environment.

"It's important for people to understand that there is no standard for what Basic should be under Windows; that standard has yet to be made," said Joseph Venuto, president of Within. "Porting Quickbasic and adding form design and a few quick commands doesn't make [Visual Basic the standard]." Still, Venuto is the first to admit that it will be hard to buck Microsoft's drawing power in large accounts.

Within, based in Laurel, N.J., introduced Realizer at Comdex/Spring '91. It is priced at $395; a runtime module is available free of charge.

Realizer reportedly enables users to develop integrated Windows applications quickly. Key pieces include the following:

- A structured superset of Basic, which includes high-level commands to simplify Windows programming. For example, Within said, Realizer can create a Window with a one-line command instead of the 50-line program needed under Microsoft's software developer's kit.

Also provided are a full range of mathematical and statistical functions, high-speed automatic array processing operations, a complete set of string commands, the ability to run Windows and DOS applications and access to DOS commands.

- Prefabricated Windows objects, such as buttons, pull-down menus and scroll bars. It also transparently handles all of the mechanics of event programming and message passing.
- Programmable Applications Tools, which allow users to add the standard elements of popular Windows applications such as spreadsheets, charts and text editors, help to eliminate the need for event programming.
- Visual Form Designer, which lets users quickly create a visual interface by simply "drawing" (resizing and moving) Windows objects, with choice of color, font and position.
- A full-featured integrated debugger and on-line context-sensitive Help. It includes a large set of sample applications, libraries and Dynamic Link Libraries.

The Realizer design team includes Steven A. Cohn, formerly on the Microsoft QuickC Presentation Manager team, and Michael Hyman, who previously worked on Microsoft's OS/2 team and wrote five books, including *Windows 3.0 for Basic Programmers.*

For another $100, users can try GFA-Basic for Windows; however, the June Programmer's Shop Catalog will offer an introductory price of $295.

GFA-Basic for Windows is said to combine the intuitive syntax of Basic with the structured programming of Pascal and C while possessing speed of execution similar to that of Assembler and compiled C programs.

In addition to 500 independent commands, GFA-Basic offers more than 400 commands related to Windows operation. The commands are said to reduce dramatically the coding required in C and totally eliminate the need for Microsoft's Software Developer's Kit.

Imaging saves money in huge bankruptcy case

ON SITE

BY CHRISTOPHER LINDQUIST
CW STAFF

MIAMI — When General Development Corp., based here, filed for Chapter 11 protection last April, it was called a "mega case" in bankruptcy lingo. But in terms of processing the hundreds of thousands of documents involved in the claims process, it was going to be a mega headache. Then the firm looked at imaging.

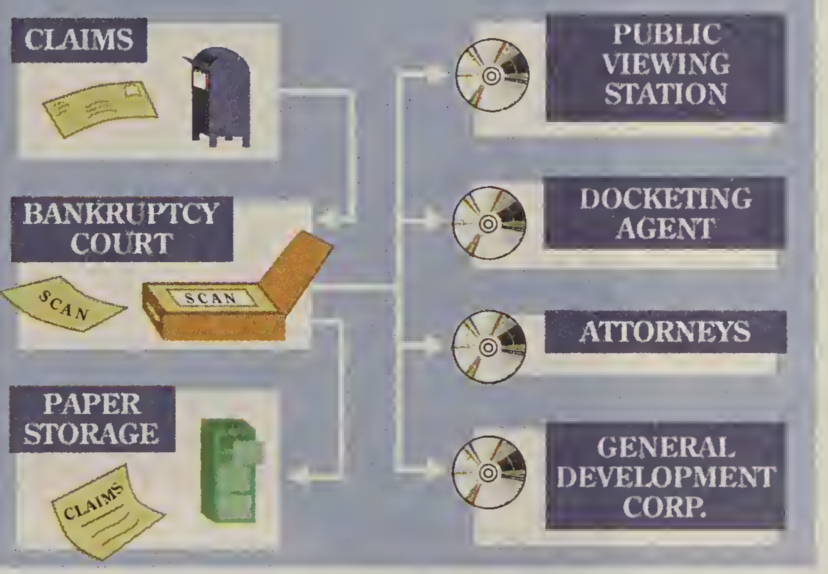
Under one section of bankruptcy code, a court can require the debtor in large cases to pay for some administrative services normally performed by the court itself. So when the bankruptcy court in the Southern District of Florida in Miami required General Development to provide a means of handling the thousands of claims from its creditors, the $500 million construction firm considered microfiche, the traditional storage medium in such cases.

However, after seeing an imaging demonstration and performing some cost comparisons, the firm decided that storing the claims on optical disc was the best alternative, according to Joe Yanero, manager of technical systems support. General Development expects to save $116,000 by using optical discs, assuming 1.5 million documents are processed during the case.

The company decided to use an imaging system from systems integrator Image Processing Corp. (IPRO) in Phoenix. Two Intel Corp. 80386-based scanning workstations were installed at the courthouse, and General Development employees worked two shifts scanning in claims and related documents as they arrived from claimants. Claims were automatically numbered as they were scanned, and the original documents were stored at the courthouse.

Working on its image

Paper documents filed in the General Development Corp. bankruptcy case are being converted into CD-ROM for processing



Source: Image Processing Corp.

CW Chart: Doreen St. John

Viewing stations for the optical platters were installed at the courthouse for public use; other viewing stations were installed at General Development, at the offices of its attorneys and at Poorman Douglas Corp., the firm creating the docket — a list of claimants — for the case.

When the discs arrived at Poorman Douglas, they were indexed only by claim number. To allow searches by other criteria, such as name, Poorman Douglas employees viewed the images and entered needed claim information into a separate database that is keyed to the claim numbers. The database was then distributed to the other viewing stations on optical disc, allowing easier searching.

Yanero said there were no serious problems in getting the system set up and getting people trained to use the scanners, but he added that care had to be taken to ensure that the claims were scanned correctly.

He added that a quality assurance program and conscientious operators can eliminate most of the potential for errors. However, if something does go wrong, imaging provides a relatively simple solution: The document can simply be rescanned and reinserted when the optical platters are updated.

The biggest advantage over both microfiche and paper came in retrieval speed, reported several users.

According to Jeff Baker, vice president and general manager at Poorman Douglas, whenever law firms wanted a paper copy of a claim to review, someone would have to go to the courthouse, stand in line, and wait for the claim to be found and copied — an expensive and time-consuming process.

Maria Adams, systems manager at the bankruptcy court, indicated there were currently about 84,000 claims and 400,000 to 500,000 pieces of paper scanned into the system. The imaging system eliminates problems associated with dealing with paper files of that size.

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Oracle unveils interface for DDE Windows

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — Oracle Corp. recently announced the first of a series of products that will use Microsoft Corp.'s Dynamic Data Exchange (DDE) protocol to swap data with other Microsoft Windows 3.0 applications running DDE.

The product, called Oracle for Windows DDE/Toolbook Interface, is capable of retrieving data from Oracle relational databases and then pasting that information into a Windows 3.0 spreadsheet or word processing package. The product is available immediately for shipment, Oracle said last week.

The $299 product is built on Oracle's new DDE Manager Version 1.0, said Jim Reilly, a senior director of marketing at Oracle's Desktop Division.

The DDE Manager contains a Query Builder that allows users to create SQL queries without detailed knowledge of the SQL language.

A future version of the Oracle DDE Manager will be designed for use by software developers who know SQL commands, Reilly said. He gave no date for the availability of the developers' version of the product.

NEC notebook PC weighs 7½ pounds

BY MICHAEL FITZGERALD
CW STAFF

BOXBORO, Mass. — NEC Technologies, Inc. released the Ultralite SX/20, a 7½-pound, 20-MHz Intel Corp. 80386SX-based notebook computer.

Analysts said NEC, long listed among the Top 5 laptop computer makers, had slipped recently as a result of significant changes in management.

"Their ranking probably remains in fifth place, but their market share is declining," said Bruce Stephen, director of personal computer hardware research at Framingham, Mass.-based International Data Corp. In terms of product, Stephen said, NEC has "been playing catch-up. They're at the tail end of the SX notebook wave, and this gets them up to par."

The company needs to push aggressively to regain its momentum, Stephen said.

The Ultralite SX/20 includes the following: a 9½-in. Video Graphics Array-compatible screen; 2M bytes of random-access memory, expandable to 10M bytes; and a 40M- or 60M-byte hard drive. It also comes bundled with Microsoft Corp.'s Windows 3.0. The product is slated to ship this month and will retail at $4,899 for a 40M-byte hard drive or $5,399 for a 60M-byte hard drive.

While the high price drew fire from analysts, NEC tends to discount heavily, Stephen said. He added that he expects street prices to be in the "more reasonable" $3,800 range.

PC & WORKSTATION SHORTS

Open systems CD-ROMs

Philips Telecommunications N.V. recently adapted the compact disc/read-only memory (CD-ROM) technology to open systems using the X/Open Company Ltd.'s Fast Track procedure. The open specifications for Philips' CD-ROMs allow applications in open systems to have access to data stored on International Organization for Standardization 9660-compliant discs.

AST Research, Inc., lured by the potential of the consumer personal computer market and the growth of superstore and electronics chains, is developing a line of products for this market, the company said late last month. It is currently negotiating with national consumer electronics chain Circuit City Stores, Inc. to sell the line. Compaq Computer Corp. and Apple Computer, Inc. are also purportedly considering superstore sales authorizations for some portion of their current product line.

High-end workstation maker **Silicon Graphics, Inc.** agreed earlier this month to resell **Tektronix, Inc.**'s Phaser II thermal wax color printers with its Iris three-dimensional workstations. The printer's high-resolution color output is well suited to the workstation's high-end graphics capabilities, the company said. Silicon Graphics' sales force is scheduled to begin handling the printers by late summer, according to the company.

Tektronix has also entered into a cross-licensing agreement with Adobe Systems, Inc., swapping some of its desktop color printing patents for rights to Adobe's Postscript Level 2 software technology.

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Keefe

CONTINUED FROM PAGE 37

Technology over anything IBM might come up with on its own. Not so Lotus.

To be sure, Frank King, senior vice president of the Lotus Software Business Group, doesn't want a repeat of the firm's Windows experience, where it bet on the wrong horse (OS/2) in the short term, losing precious time in the Windows market.

The pragmatic King says that *if* IBM and Microsoft go their own ways on portable OS/2, you can expect Lotus to support both efforts.

Tell us how you really feel. Apple Chairman John Sculley was quite effusive in his praise for Lotus' recently unveiled 1-2-3 for the Macintosh. Not only did he say it was "extremely important" for the Macintosh, he also predicted that the latest release of 1-2-3 would be "well-used" at Apple.

Of course, he had a little more than three and a half years to polish his speech. He also pointed out that 1-2-3 for the Macintosh will be the most heavily scrutinized product of the early '90s.

Sculley rewarded Lotus rival Microsoft — which has been in the corporate trenches with Apple pitching its Excel spreadsheet for the Macintosh — by touting 1-2-3 for the Macintosh as having "more functionality than any other spreadsheet on the market."

> MICROSOFT SAYS the developer's kit is supposed to ship by the end of this year, but as one user commented, "Those guys are always six months off."

He also said Apple now has "the chance to be a real player in the multivendor workplace with the most important power application [1-2-3] in the world." Bet they're still smarting in Bellevue.

Second verse (almost) the same as the first. Will Fastie, editor of the "Fastie Report," gave 1-2-3 for Windows the thumbs-up. His preliminary analysis shows 1-2-3 for Windows is "better than Excel." Why? Because little, subtle things mean a lot. Fastie suggested that users "will come to like 1-2-3/W better" than Excel for a variety of reasons, including the way Lotus handles pasting graphics onto the same page and the way it handles multidocument spreadsheets.

"Not the kind of things that come up when you look directly at a product and try to do a review," he said, explaining that they are the sort of differences you'd notice only after a longer evaluation. "I sense Lotus has a winner on their hands, and Excel will be up against the wall defending [itself]," he said.

Are you taking notes? Sculley also dropped some hints about Apple's forthcoming notebook computer, slated for a fall release. Noting that Apple was late (to put it mildly) entering the laptop market (with a BIG laptop, to boot), he asserted that Apple "does not intend to be left behind" in the notebook segment. As one wag noted, Apple had better get going. Notebooks are not new.

Sculley also suggested the Macintosh was always better suited to a notebook than to a desktop. Alluding to the 1-2-3 for the Macintosh announcement, he hinted that "what Lotus did with its Mac spreadsheet ties in real well" with Apple's notebook.

Consider that 1-2-3 is already available on the Poquet and HP palmtops. Why not the Macintosh? After all, according to Sculley, 1-2-3 for the Macintosh is a product whose time has come.

Keefe is *Computerworld*'s senior editor, PCs and workstations.

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Word: Tight Windows link, complex tools

Microsoft Corp.'s Word for Windows Version 1.1

Reviews	Performance	Ease of use	Editing capability	Printer support	Network support	Documentation	Service and support	Value	Score
Infoworld 1/7/91	Very good	Excellent	Excellent	Excellent	Very good	Very good	Very good	Excellent	8.3*
PC Week 2/31/90	Fastest GUI word processor	Good	Good	NC	Good	Good	NC	Ideal for more demanding users	Analyst's choice
PC World 6/91	Good	Good	Excellent	NC	NC	NC	NC	Excellent	Makes full use of Windows power
Users									
Ian Wallace, Washington State Criminal Justice Training	▪▪▪▪	▪▪▪	▪▪▪▪	▪▪▪	▪▪▪	▪	▪▪▪▪	▪▪▪	WYSIWYG format saves time
Peter Crosby, Telectronics Pacing Systems, Inc.	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪	▪▪▪▪	▪▪▪▪	Excellent
Jeff Cairns, Pacific Bell	▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪	▪▪▪▪	▪▪▪▪	Flexible, powerful but slow
Analysts									
Oliver Picher, Datapro Research Group	▪▪▪	▪▪▪	▪▪▪▪	▪▪▪▪	▪▪	▪▪▪▪	▪▪▪	▪▪▪	Very customizable
Scott Higgs, National Software Testing Laboratories, Inc.	▪▪	▪▪▪▪	▪▪▪▪	▪▪▪	▪▪▪▪	▪▪▪	▪▪▪▪	▪▪▪▪	Needs powerful platform
Jerry Caron, Faulkner Microcomputer Reports	▪▪	▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪	▪▪▪▪	▪▪▪	▪▪▪	Depends on Windows

Key: ▪▪▪▪ Very good ▪▪▪ Good ▪▪ Fair ▪ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey.
**Infoworld* score based on 1 to 10 ratings. NC: No comment

Technology Analysis — A roundup of expert opinions about new products. Summary written by free-lance writer Suzanne Weixel.

Microsoft Corp.'s Word for Windows Version 1.1 is more than a Windows 3.0-compatible word processor. Within its design are complex tools for automated document access and processing. Reviewers were impressed by this powerful combination of functions but wondered whether this is really what users want from a word processor.

Performance: In what-you-see-is-what-you-get (WYSIWYG) mode, Word for Windows is slow, and it gets slower as documents become more complex.

Minimum system requirement is an IBM Personal Computer AT or compatible with a hard disk and 640K bytes of random-access memory, but most recommended a faster processor and at least 1M byte of RAM.

Microsoft has built-in keyboard shortcuts and other conveniences.

Ease of use: Windows 3.0 users will feel right at home with the graphical user interface (GUI), reviewers reported. Even novices can get up to speed quickly on basic word processing, largely because of the "Ribbon and Ruler" features that let users choose text attributes simply by clicking on icons.

However, Word for Windows is not a simple program. According to *PC Magazine,* users may take years to master some of the more advanced capabilities.

For instance, the package's macro language includes a complete set of programming constructs. Fields can contain embedded control codes for performing calculations or automatically inserting information such as the current date and time.

The macros and fields are combined with the program's document templates, enabling users to automate document creation. However, reviewers recommended that the average user leave these features alone because they are too complex.

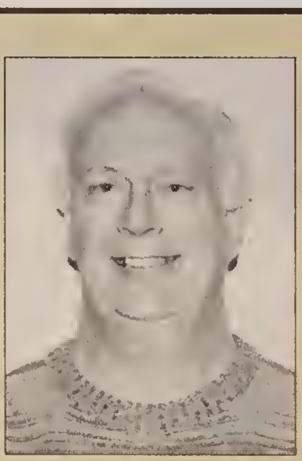
Vendor financial ratings

Analysts	Long-term stability	Short-term performance	Outlook
Peter Rogers, Robertson Stephens and Co.	▪▪▪▪	▪▪▪▪	Very good
W. Christopher Mortenson, Alex. Brown & Sons, Inc.	▪▪▪▪	▪▪▪▪	Very good

Microsoft Corp. in Redmond, Wash., reported third-quarter (ended March 31, 1991) net income of $123.8 million, compared with $75.2 million for the same period last year. Sales were $486.9 million for the quarter, compared with $310.9 million last year.

Editing capability: The package's basic editing tools are exceptional, reviewers said. Users can open as many as nine files at one time. Word also features column selection, rectangular cut and paste and complex search and replace.

Mail merge and outliner facilities are also strong, but the spell checker has some limitations.



"WORD'S WYSIWYG capability allows a greater possibility of getting the document right the first time. Without it, you can waste a lot of time cutting and pasting and doing repeated corrections."

Ian Wallace
Systems manager
Washington State Criminal Justice Training Commission

Support for style sheets is strong but awkward to use, reviewers reported. Graphics support is weak because graphics are not well-integrated with the mouse-based interface.

Printer support: Printer support is integrated with Windows 3.0, which reviewers said can sometimes be slow and unreliable. For example, *PC Magazine* found a bug that causes text in tables to print with the last character of a word kicked over to the next line.

Network support: Users can open files being used by someone else in read-only mode and then save changes by storing the file under a new name. Windows 3.0 handles all the network configurations.

Documentation: The package comes with one hardcover book that is comprehensive and clearly written but not well organized, reviewers said.

Service and support: Microsoft provides a 30-day, money-back satisfaction guarantee and a 90-day money-back warranty. Telephone support, which reviewers rated as high quality, is free but not toll-free.

Value: According to reviewers, Word for Windows is the word processor most thoroughly integrated with the Windows 3.0 environment. Whether or not users ever operate the customization and development features, the basic word processing tools are complete, flexible and easy to use. Built-in shortcuts help offset the lack of speed inherent in a GUI-based program. Word for Windows 1.1 costs $495.

Microsoft responds

Jon Reingold, group product manager for Word

Performance: To scroll faster in WYSIWYG mode, you can shut off certain features, such as the display of pictures.

Ease of use: The small group of people who use Word for Windows as a development environment and customization tool have experience using complex programs.

Editing capability: Our spelling checker has 130,000 words and is fast and accurate. We wanted to get the mainstream word processing basics in place before implementing many desktop publishing features.

Printer support: When Windows 3.1 is released with Truetype, the discrepancies between what users see on the screen and what prints out should disappear. There is a very nice third-party solution for printing special characters.

Documentation: The documentation is complete and accurate. We do not include the printed macro manual because we don't want the average user to be intimidated by its complexity.

NEXT WEEK

▶Ashton-Tate Corp.'s Multimate Version 4.0 has powerful features but is primarily suitable for simple documents because of its basic interface and editing, reviewers said.

NEW PRODUCTS

Systems

Advanced Logic Research, Inc. (ALR) has announced a new family of file servers with an upgrade path to Intel Corp. I486-based dual processing.

The Powerpro VM Series includes 5M bytes of standard system memory and a caching enhanced small device interface hard disk controller to achieve high I/O rates, ALR reported. Models are available with Intel 80386 and I486 processors of varying clock speeds.

With a 650M-byte hard drive, a 33-MHz system costs $10,995. A 25-MHz model costs $9,995.

ALR
9401 Jeronimo
Irvine, Calif. 92718
(714) 581-6770

Macintosh products

Go Technology, Inc. has released two new versions of Hot Keys, its function key macro system for the Apple Computer, Inc. Macintosh.

The new versions support Aldus Corp.'s Pagemaker 4.0 and Silicon Beach Software, Inc.'s Personal Press.

Hot Keys includes more than 140 predefined macros that perform common keystroke routines in the supported application; it also allows users to create custom macros. A keyboard overlay is included with the program.

Hot Keys costs $59.

Go Technology
2nd Floor
918 Northwood Blvd.
Incline Village, Nev. 89450
(702) 831-3100

Software utilities

Nu-Mega Technologies, Inc. has upgraded CV/1, its utility for the Microsoft Corp. Windows Software Development Kit (SDK) Codeview debugger.

Version 2.0 of CV/1 allows Codeview to run in a small window, leaving the program code on-screen and eliminating the need to toggle between character and graphics modes when using the debugger.

A single-user license costs $129; upgrades are available for $39.

Nu-Mega Technologies
225 Lowell Road
Hudson, N.H. 03051
(603) 888-2386

Agog, Inc. has created Squash, a file compression and floppy disk backup software utility for Next, Inc. workstations.

Squash can be operated via hot key from the Next Workspace Manager interface. Compression is automatically performed at the time of backup. A decompression program is provided for distribution with compressed files.

Squash costs $99.95 for one license and $899.50 for a 10-user license.

Agog
13780 N. River Highway
Grand Ledge, Mich. 48837
(517) 627-2186

Development tools

XDB Systems, Inc. has begun shipping the XDB-Windows Software Developers Kit (SDK) for SQL implementation under Microsoft Corp.'s Windows 3.0.

The kit consists of the XDB SQL Engine Version 2.4; a redirector that manages packetization for communications between personal computers running Windows and a network server; a C language application programming interface; and a C precompiler for embedded SQL functions.

The SDK is priced at $750.

XDB Systems
14700 Sweitzer Lane
Laurel, Md. 20707
(301) 317-6800

Aion Corp. has announced availability for Checklist Builder, a personal computer-based tool for generating checklists through custom applications.

The product features an on-line Help facility, a text editor, reporting facilities and automatic logic checks for internal consistency in generated lists. It is targeted at applications in expense authorizations, ordering procedures and project administration. It is intended for users with area-specific knowledge but limited programming knowledge, according to the company.

Checklist Builder costs $995, with an introductory price of $695 offered until June 30. Free telephone support for 90 days is included.

Aion
101 University Ave.
Palo Alto, Calif. 94301
(415) 328-9595

Database management systems

Ace Software Corp. has unveiled Acefile ($295), a database for the Microsoft Corp. Windows 3.0 environment.

Users can work on as many as 10 databases simultaneously in Acefile. The program offers what-you-see-is-what-you-get page preview and 15 types of report charts with two- and three-dimensional graphics. It includes extra features such as a mini word processor for mail merges and an autodialer.

Ace Software
Suite 680
1740 Technology Drive
San Jose, Calif. 95110
(408) 437-3456

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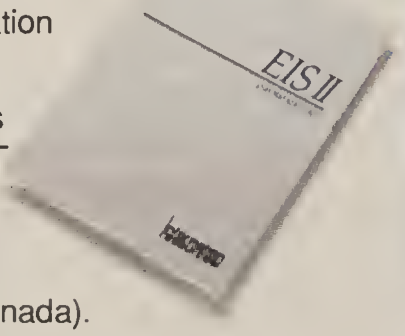

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*David W. DeLong, co-author of "Executive Support Systems: The Emergence of Top Management Computer Use."
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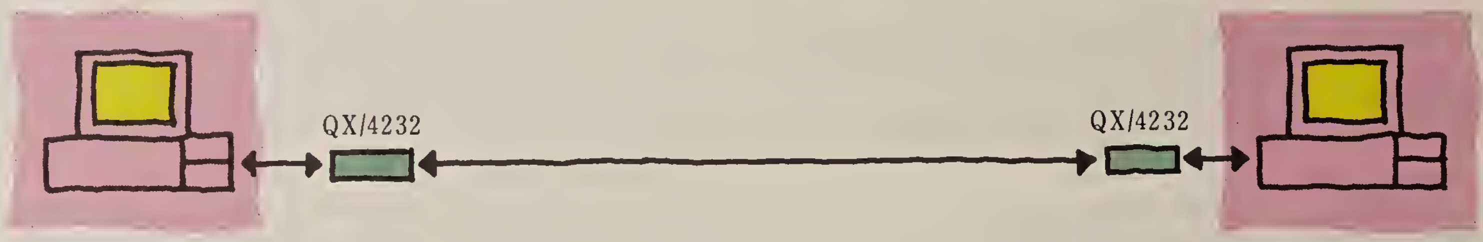

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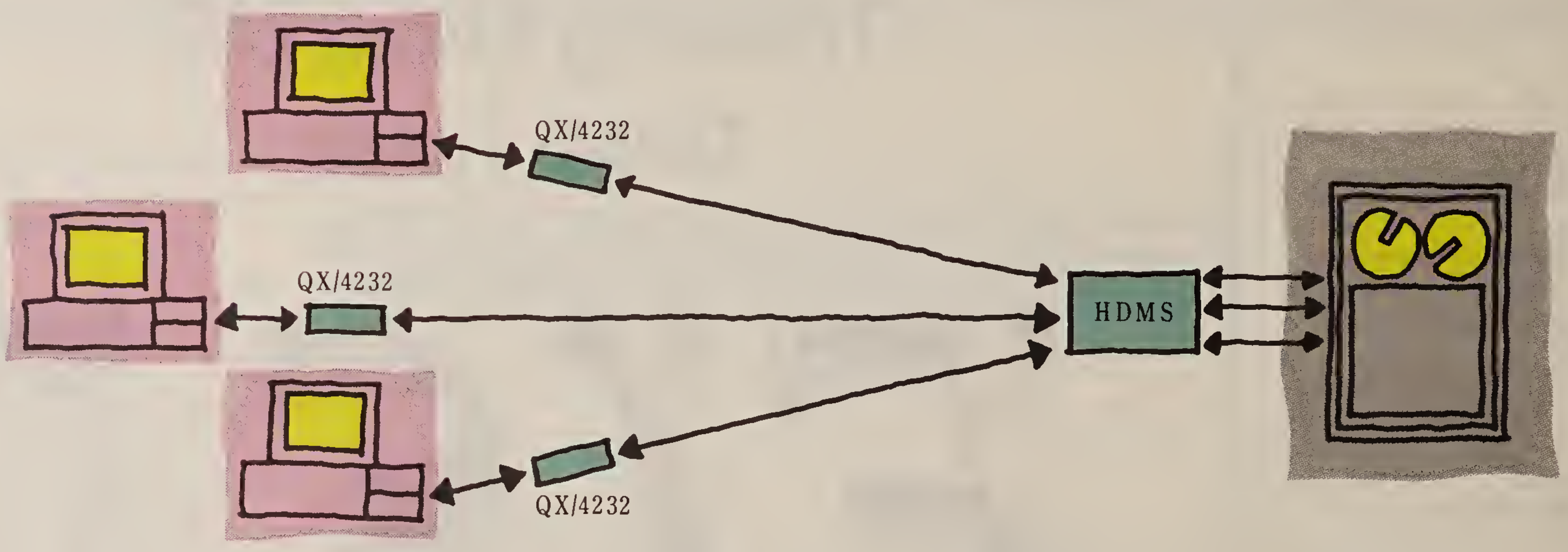

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Copper matures as FDDI alternative

BY JOANIE M. WEXLER
CW STAFF

The 100M bit/sec.-over-copper technology touted at trade shows and standards meetings during the past year is expected to materialize into products by the end of the summer.

Assuming Digital Equipment Corp. and Network Peripherals, Inc. deliver on commitments made earlier this month to ship 100M bit/sec., shielded twisted-pair network interfaces in August, users could soon save about 30% by using the copper alternative to Fiber Distributed Data Interface (FDDI) for backbone-to-desktop applications.

For example, DEC's copper offering runs about $5,200 to $5,500 per seat compared with its $7,500 to $8,000 per-seat fiber connection cost (requiring the use of a concentrator).

Network Peripherals' copper interface cards cost $1,995 to $2,795 in quantities of five or more; use of the company's concentrator brings the per-port cost to about $5,200.

Mixed feelings

Users expressed mixed opinions about the usefulness of yet another cabling decision option. "My feeling is that we'll be more interested in fiber than copper to the desktop," said Ed Riddle, head of the communications and network systems branch at the National Aeronautics and Space Administration-Langley Research Center in Hampton, Va.

The shielded twisted-pair FDDI products will probably best satisfy investment-protecting users with that medium already installed throughout their premises, such as The Naval Mine Warfare Engineering Activity in Yorktown, Va.

Ray Parcell, a computer operations specialist there, said that because his cabling plant is already wired with thin-wire coaxial cable — also supported by DEC products — and shielded twisted-pair, "my existing cabling should now see me through retirement."

The commercial sector is in less of a rush for 100M bit/sec. to the desktop. "We don't yet have applications that require 100M bit/sec., and even if we did, computer processors today aren't fast enough to keep up with the network," said Sholom Bryski, manager of distributed systems and networks at Bankers Trust Co. in New York.

"PC-oriented environments generally don't run applications requiring 100M bit/sec. to the desktop. When multimedia applications kick in around 1994, that will drive those bandwidth needs," added Marty Palka, a senior analyst at Dataquest, Inc. in San Jose, Calif.

Shipments slated

Smart-hub maker Synoptics Communications, Inc. has said it will ship its 100M bit/sec. shielded twisted-pair products in the fall. Competitor Chipcom Corp. has targeted early 1992 for its initial shipments.

Availability dates came on the heels of a move by DEC, Synoptics, Chipcom, Motorola, Inc. and Advanced Micro Devices, Inc. last month to develop a standard specification for 100Mbit/sec. over shielded twisted pair [CW, May 27]. The effort is meant to ensure interoperability among vendors' products in advance of an actual standard under construction by the American National Standards Institute FDDI committee.

Efforts are also under way at ANSI to put the high data rates over unshielded twisted pair — a significantly larger technical challenge, but a move that would be of more widespread use. Of the twisted-pair wiring currently installed within corporate walls, only about 35% is shielded twisted pair, according to In-stat, Inc., a market research firm in Scottsdale, Ariz.

Shielded twisted pair enthusiasts predict that having an alternative to fiber should drive prices down for the entire 100M bit/sec. market.

Figuring cost

To calculate your per-user costs for a 100M bit/sec. network connection, add up the following component prices:

- Network adapter card for each desktop device.
- Total cost of concentrator, if used, divided by number of ports it supports.
- Cost of installing cabling and the cable itself, if investing in a new cable plant.

Do laws protect wireless nets?

BY MITCH BETTS
CW STAFF

At Issue:
PRIVACY

WASHINGTON, D.C. — The 1986 federal law that makes it illegal to intercept electronic messages has short-circuited. It apparently fails to cover wireless data communications, such as the traffic over wireless local-area networks, according to a report prepared for a U.S. Senate subcommittee.

The Electronic Communications Privacy Act of 1986 (ECPA) "failed to anticipate fully the expansion of the number and kinds of private communications that can and will be carried by 'wireless' systems where some or all of the communication is carried by radio link," the report said.

ECPA should be updated to protect most radio-based communications technology from unauthorized interception, the Privacy and Technology Task Force recommended in a report to Sen. Patrick J. Leahy (D-Vt.). Leahy, a principal sponsor of the 5-year-old privacy law, is chairman of the Senate Subcommitee on Technology and the Law.

Keeping up

Leahy formed the task force to assess whether ECPA is keeping up with new technologies. The law updated the 1968 Wiretap Act, which protected only voice transmissions, to include data and video traffic carried over telecommunications lines. But in the case of wireless data communications, "there is a likelihood that such communications will not be [legally] protected unless the user goes to the expense of full data encryption," the report said.

Likewise, the emerging technologies of radio-based private branch exchanges and personal communications networks are not clearly covered by ECPA, the task force said.

ECPA has done a good job of legally protecting the privacy of electronic mail, one of its primary goals, the 16-member panel said. The act covers E-mail carried by value-added network vendors but was not intended to cover E-mail on private networks because they are not publicly available.

In light of the controversy over employers reading workers' E-mail, however, the task force recommended that employers adopt clear policies describing when E-mail can be reviewed by supervisors and establish employee safeguards.

"In general, the terms on which employers can access electronic files will be the subject of policy manuals and employment agreements," so changes in ECPA are not needed at this time, the report said.

Blurred lines

The report acknowledged that the distinction between private and public E-mail systems will become blurred by interconnections between the two, so it may become more and more difficult to determine which systems are covered by ECPA.

"In addition, messages originating on tightly controlled systems may make their way through 'gateways' to E-mail systems with far less rigorous controls on access, without notice to users of the systems," the report said.

The task force also studied caller identification services and how telephone companies handle information about customers' network traffic, but it failed to reach a consensus on the need for federal legislation.

The task force, chaired by consultant John D. Podesta, included representatives from the American Civil Liberties Union, AT&T, Citicorp, Computer Professionals for Social Responsibility, the Electronic Mail Association, consumer advocacy groups and three regional telephone companies.

Users uneasy as 3Com moves to LAN Manager

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — Even reassurances from the chief executive officers of 3Com Corp. and Microsoft Corp. recently failed to quell user uneasiness about 3Com's migration path away from 3+Open and toward Microsoft LAN Manager.

Microsoft CEO Bill Gates and 3Com CEO Eric Benhamou addressed a meeting of the 3Wizard Council — a gathering of several hundred expert 3Com users and developers. They heard concerns about the eventual demise of 3Com's 3+Open local-area network operating system, which 3Com will maintain for up to five years.

Gary Cunningham, one of the 10 users who sits on the 3Wizard Council, said there is confusion among users about which LAN product to use — with some even considering shifts to Novell, Inc. and Banyan Systems, Inc. LANs.

"We bought our [network operating system] from 3Com and built everything around it," said Cunningham, a network administrator at GTE Corp. in Lexington, Ky. "Now, we're buying our LAN product from [Microsoft], and many of us don't know which way to go."

Even so, several users said it will be technically easier to go to LAN Manager than to any other LAN product. "It's much easier than going to Novell," said one user, who works for a utility firm and declined to be identified. "My only concerns are in the area of technical support. I wanted to hear that Microsoft was going to give us technical support."

Taking steps

Gates, for one, said Microsoft is taking several steps to ensure an easy migration to LAN Manager 2.0, including setting up Microsoft "transition" teams to distribute technical information to 3Com users and to hold user meetings.

Gates said Microsoft is also considering the placement of more LAN Manager 2.0 information on the Compuserve data service, so that 3Com users, among others, could more quickly learn of technical changes.

"We're serious about this business. That you can't question," Gates told a gathering of users after his speech here. "But only one of us [Microsoft or 3Com] could afford to carry the architecture forward. The question of how well we'll do against Novell is up to us, every day."

Think about your own LAN for a moment. A complex mix of clients and servers. Hosts and terminals. Bridges and routers. Ethernet and Token Ring.

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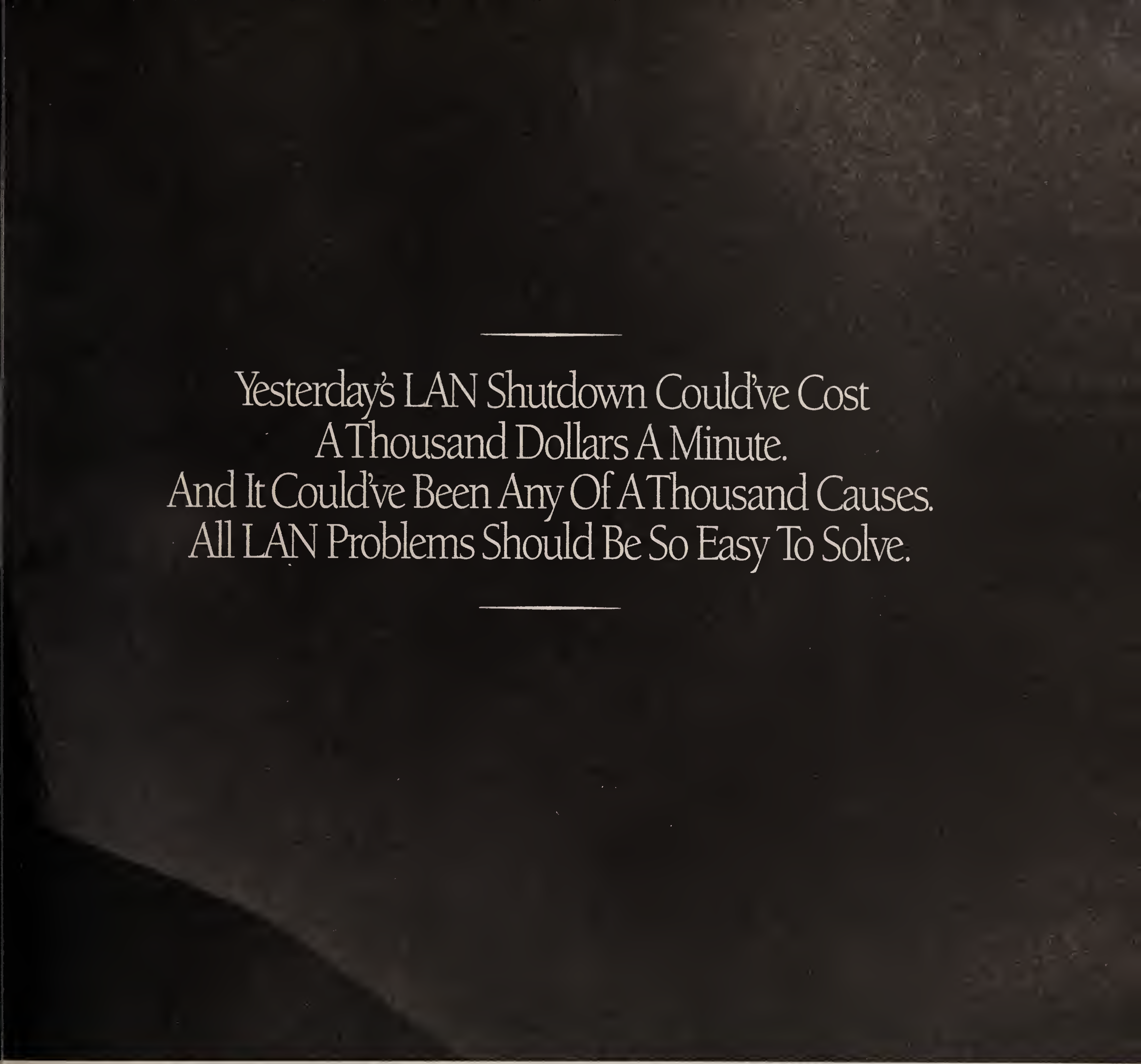
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Everybody's talking OSI at ICA

DEC, AT&T and others relate plans for support of the network protocol

BY JIM NASH
CW STAFF

ANAHEIM, Calif. — Attendees at the International Communications Association conference here recently found a growing number of exhibitors talking about frame-relay services and a renewed commitment to supporting Open Systems Interconnect (OSI) standards.

"The OSI mythology that OSI is going to solve everyone's plumbing problems is as high as it's ever been," said Craig Burton, a principal at Clarke Burton Corp., a consulting firm in Salt Lake City. That does not mean resurgent support for OSI is for show only, Burton said.

Digital Equipment Corp. outlined its OSI and Transmission Control Protocol/Internet Protocol plans for Decnet [CW, June 10]. Meanwhile, AT&T said it would publish its Accumaster Integrator alarm interface and its support documentation for AT&T's Simple Network Management Protocol, increasing the warp in which third-party network devices can send alerts to AT&T's network management platform.

Of the frame-relay announcements, Burton said, frame relay is enjoying a burst of support as vendors and users look for a wide-area networking connection that is more elegant than X.25 and less expensive than switched multimegabit data service.

MCI Communications Corp. said it will offer frame-relay services. Expected to be available in the second quarter of 1992 at 56K bit/sec., T1 and fractional T1 speeds, MCI's offering will first put the service on permanent virtual circuits. Future plans call for switched virtual circuits, offering direct-dial data transmission into the service. Pricing is being determined.

Observers noted that only Williams Telecommunications Corp. has an operating frame-relay service.

Several firms took the opportunity to announce new private branch exchange (PBX) products:

- Toshiba America Information Systems, Inc. announced its first U.S. midrange, digital PBX called Perception 4000. It can handle 960 data and voice connections at once. Toshiba has not released the product's price or expected shipment date.
- Northern Telecom, Inc. announced the July availability of a hang-on-the-wall, digital PBX that handles offices with 30 to 200 telephone lines. The product, called Meridian 1 Option 11, will cost about $41,000 when outfitted with software, 80 voice/data lines and integrated Meridian voice mail.
- A spread-spectrum radio PBX was announced by Spectralink Corp. in Boulder, Colo. The Spectralink 2000 Pocket Communication System combines small, cordless telephones with a cellular PBX system for office telecommunications.

Frame relay talk puts Bellcore in new light

BY JOANIE M. WEXLER
CW STAFF

Bell Communications Research, Inc., the research and development arm of the regional Bell telephone companies, reportedly broke its silence on frame-relay wide-area networking at the recent International Communications Association show in Anaheim, Calif.

Bellcore, which has been touting the Switched Multimegabit Data Service (SMDS) that it has been developing for the local telephone companies, conducted a frame-relay session that one analyst described as a very accurate and frank tutorial that could "make the myth that Bellcore has been anti-frame relay go away."

Steve Taylor, president of Distributed Networking Associates in Greensboro, N.C., added that Bellcore positioned frame relay as a currently available technology that "looks good for the immediate future at speeds up to T1 [1.5M bit/ sec.]" and that it acknowledged SMDS "is a ways off."

H. Paris Burstyn, vice president of telecommunications at Business Research Group in Newton, Mass., said that "Bellcore has not been very vocal about frame relay in the past, and there is confusion in the industry" about whether the two technologies will ultimately be competitive or complementary.

Richard T. Aloia, assistant vice president of network access technology at Bellcore, told *Computerworld* that "frame relay fills a slot now. SMDS is the first step toward broadband [above 1.5M bit/sec.] Integrated Services Digital Network."

Frame relay — a point-to-point-oriented form of packet switching that is more efficient than X.25 because it eliminates node-to-node error checking — is dependent only on interfaces and software for existing equipment for implementation.

SMDS, on the other hand, requires a whole new switch architecture, is "connectionless" and aims to support speeds upward of 45M bit/sec., Burstyn said.

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As a result, NETBuilder cuts three big expense items in internetworking—new hardware purchases, and the training and servicing to support it.

Yet, you sacrifice nothing for this simplicity.

Access to NSFnet broadened

BY ELISABETH HORWITT
CW STAFF

ELMSFORD, N.Y. — Commercial companies will now be able to take advantage of NSFnet, the National Science Foundation's 45M bit/sec. backbone, which was previously accessible only to not-for-profit research, educational and government organizations.

Advanced Networks & Services, Inc.'s commercial subsidiary, ANS CO+RE Systems, Inc., will provide the commercial services. ANS — a consortium consisting of IBM, MCI Communications Corp. and Merit Network, Inc. — operates NSFnet.

The foundation had previously kept commercial traffic off of its network. NSFnet is a service offered free of charge to nonprofit institutions at taxpayers' expense, said Steve Wolff, the foundation's director of networking.

ANS will offer commercial services on a "logically distinct" portion of NSFnet and will charge commercial users so that the new service will pay for itself, Wolff said. Indeed, profits from the service will go to upgrading the NSFnet infrastructure. For example, the foundation is thinking of funding upgrades to 45M bit/sec. for some regional networks that communicate via its backbone, Wolff added.

NSFnet said it expects to complete by Aug. 1 an upgrade of 16 nodes on its backbone from 1.5M bit/sec. to 45M bit/sec. speeds, Wolff said. However, the links are now scheduled to be upgraded by fall, according to Allan H. Weis, ANS president and chief executive officer.

The academic, research and government organizations that now use NSFnet will benefit by being able to use the same facilities to communicate with enterprises with which they do business, Wolff said. For example, government agencies can discuss design with aerospace contractors, and university users can access commercial information services.

Nonprofit organizations that use the commercial service will be charged 20% to 40% less than commercial users, Weis said. "It will be similar to the discounts most computer companies give to universities."

Service providers are likely to be one of the service's biggest customer segments, Weis added. "There are about 10 million people on NSFnet; that's one wonderful market for an information provider."

Commercial users

In addition, ANS said it expects government contractors, pharmaceuticals firms and computer and chip companies to sign up for the service, Weis said. Indeed, the service will have a special offering geared to computer conferences. This will allow a computer vendor to set up a 45M bit/sec. link between a workstation on the floor and a supercomputer or other equipment back at the home office, he added.

Customers will be able to access the new service via an IBM RISC System/6000-based router or a Cisco Systems, Inc. router attached to a local-area network, Weis said. ANS plans to incorporate Cisco routers into NSFnet under a joint agreement announced last month.

The routers will potentially allow NSFnet to support protocols other than Transmission Control Protocol/Internet Protocol and Open Systems Interconnect, Weis said.

Automotive group thwarts Edifact protocol proposal

BY ELLIS BOOKER
CW STAFF

SOUTHFIELD, Mich. — A call last month by telecommunications experts at some of the country's largest automobile makers urging the industry to migrate from U.S. standards for electronic data interchange (EDI) to an international protocol is on ice, according to officials at the Automotive Industry Action Group (AIAG).

The proposal, made in early May at the international conference of the AIAG, called for the group's guidelines to use Edifact, the EDI protocol codified by the United Nations' committee of the same name, by 1994.

"That recommendation was not accepted by the group," reported Joseph R. Phelan, a Ford Motor Co. executive and the AIAG's executive director. However, an ad hoc committee had been formed to investigate the issue "and look at what the best program would be for [moving to] Edifact," Phelan said.

Phelan conceded that the short-term costs of such a conversion could be the biggest obstacle to the AIAG's 700 corporate members.

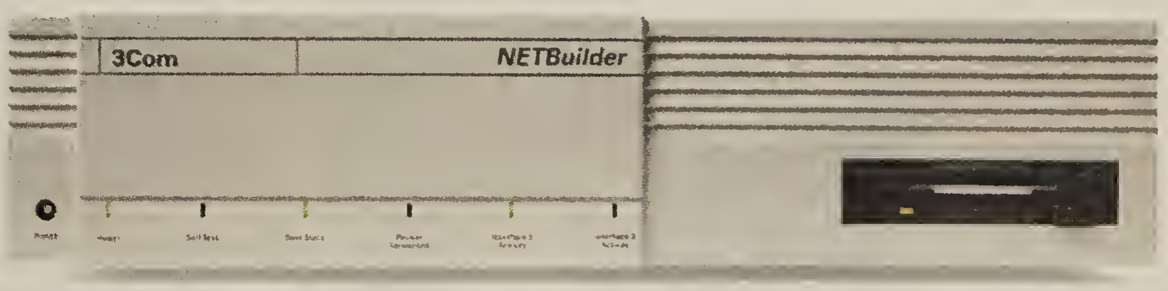
He noted that Ford Motor Co. had only recently completed the conversion from a proprietary standard to X.12 and that General Motors Co. was still undergoing this process. The third of the "Big Three" automakers, Chrysler Corp., is an X.12 shop.

The AIAG director predicted the group will adopt a more conservative migration plan.

Today, if a U.S. firm uses a standards-based protocol rather than a proprietary scheme, it looks to the ANSI X.12 standards.

However, Europe's automotive industry body, Odette, plans to implement Edifact's standards by 1994.

Ch Changes.



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NEW PRODUCTS

Local-area networking hardware

LXE, Inc. has announced support for Transmission Control Protocol/Internet Protocol (TCP/IP) communications on its radio frequency inventory control terminals.

The addition of TCP/IP support allows users to integrate inventory data collected via handheld wireless scanners into Ethernet local-area networks.

The scanners transmit data to LXE's radio frequency terminals, which connect to thick- or thin-wire Ethernet LANs via the LXE 228NC and 280NC network controller units. Up to 64 radio frequency units can be attached to each network controller.

The 228NC and 280NC also support communications with IBM and Unix hosts.

The 228NC, which controls a single radio frequency channel, costs $9,460. The multichannel 280NC can be connected to multiple hosts and is priced at $14,560.

LXE
Suite 144
303 Research Drive
Norcross, Ga. 30092
(404) 447-4224

Local-area networking software

Software Business Technology Corp. (SBT) has announced accounting and business information software for companies downsizing from minicomputers and mainframes to personal computer networks.

The SBT Professional Series is comprised of System Manager, General Ledger, Accounts Payable and Receivable, Sales Orders and Purchase Orders modules priced at $1,295 each.

The series offers a network messaging center and hot-key access to business data, according to SBT.

SBT
1 Harbor Drive
Sausalito, Calif. 94965
(415) 331-9900

Modems

Microcom, Inc. has announced the Microporte line of portable V.42 bis modems.

The Microporte 542 ($449) offers throughput up to 9.6K bit/sec. using 4:1 data compression. It runs on a 9-V battery.

The 1042 model ($649) includes password security and achieves 12K bit/sec. transmission.

Each model weighs seven ounces and includes Microcom's Carbon Copy file transfer software.

Microcom
500 River Ridge Drive
Norwood, Mass. 02062
(617) 551-1000

Digital Access Corp. has announced the Fracdial 14x1 and 24x1 user-selectable bandwidth modems.

The Fracdial 14x1 supports dial-up bandwidths up to 768K bit/sec. in 56K or 64K increments, depending on user selection. The 24x1 model offers full T1 or 1.344M bit/sec. capacity.

The 14x1 is priced at $6,995. The 24x1 costs $11,500.

Digital Access
Suite 200
11501 Sunset Hills Road
Reston, Va. 22090
(703) 481-6900

Network management

Hughes Network Systems, Inc. has released the Graphic Network Operator Console (GNOC), a graphical management and control user interface for the company's Integrated Packet Network (IPN).

GNOC provides a graphics representation of the network with control facilities featuring configuration, event management and troubleshooting. Detailed online Help is provided.

The product is connected to IPN via a standard X.25 public network interface.

The GNOC with a 17-in. monitor costs $13,000. A version with a 21-in. monitor costs $16,500.

Hughes Network Systems
11717 Exploration Lane
Germantown, Md. 20876
(301) 428-5500

Host-to-host

Forest Computer, Inc. has created a service for program-to-program communications between IBM midrange computers and Digital Equipment Corp. VAX systems.

The service is part of the Connection System, Forest Computer's IBM/DEC connectivity product. It allows real-time data exchange and communicates with each system's standard program-to-program interface via Token Ring or Ethernet networks.

The Connection System also supports bidirectional terminal access, remote job submission and print queue redirection. Entry-level pricing, including program-to-program service, begins at $39,000.

Forest Computer
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MANAGEMENT SHORTS

IS executive wins award

A senior executive at **Metropolitan Life Insurance Co.** in charge of information systems and other functions has received the Distinguished Alumni Award from her alma mater, Pennsylvania State University. Executive Vice President **Catherine A. Rein** joined Metropolitan in 1985.

Cause, the association for the management of IS in higher education, has appointed **Indiana University President Thomas Ehrlich** to its board of directors. His appointment is the first in a planned expansion of the Cause board.

Straight **two-week vacations** for U.S. workers are going the way of the Univac computer — obsolete. That is according to 632 respondents recently polled by the Houston-based **American Productivity & Quality Center.** A whopping 85.7% said they take vacations shorter than one week. Among reasons cited for eschewing longer getaways were "hard to get away," "too many problems to face when you get back" and "too much piled up when you return."

Companies worldwide spent $2 billion on IS education and training in 1990, according to **Ledgeway/Dataquest** in Lexington, Mass. The research firm predicted that the training market will more than double by 1995 with an annual growth rate of 15.7%. The U.S. market of $1.4 billion in 1990 will grow by 14.7%, the firm said.

DSS-92, the conference on decision support systems, has issued a call for papers for its 12th International DSS Conference to be held in May or June 1992 in Chicago. The conference theme is the impact of information technology support on individuals, groups and organizations. Proposals should be sent to Joyce Elam, program co-chairwoman, Department of Decision Science, Florida International University, University Park, Miami, Fla. 33199, (305) 348-2719.

Leaping to top of the IS world

The success of Bergen Brunswig is often attributed to the work of Anthony Vallario

BY JIM NASH
CW STAFF

When a teenage Anthony Vallario first saw his future wife Marie, he was blowing ugly notes out of a horn while standing at the rear of a Bronx drum and bugle corps. She was a white-booted majorette strutting out front.

Vallario had joined the corps during World War II to hone his organizational and leadership skills. Upon seeing Marie, however, he decided to alter his goals to include meeting and eventually wooing her.

Almost 50 years later, one can see how Vallario has repeated this pattern, leapfrogging goals like a checkers player on his way to being kinged. The veteran information systems executive has amassed a passel of successes along the way — and a few stinging lessons as well.

Vallario, 62, is at a point in his life when such retrospectives are natural. At the end of this month, he will retire from Bergen Brunswig Corp., his employer since 1949. He will leave the Orange, Calif.-based distribution firm as senior vice president. Denny Steele, who joined Bergen Brunswig in November 1989, will succeed Vallario; Steele took over as vice president of information services last January.

Bergen Brunswig is the No. 2 firm in the nation's $30 billion-per-year

Continued on page 55

INSIDE

▶Another veteran IS executive retiring this month, Merrill Lynch & Co.'s DuWayne Peterson, leaves behind a legacy of both personal and corporate success. Page 54.

PROFILE: Anthony Vallario

Alan Levenson

Position: *Senior vice president of Bergen Brunswig Corp. (retiring)*
Mission: *Handling the information systems needs of the $4.4 billion wholesale drug company and forging links to pharmacy retailers*

Survey: MIS likely to draw fewer MBA grads

BY ELLIS BOOKER
CW STAFF

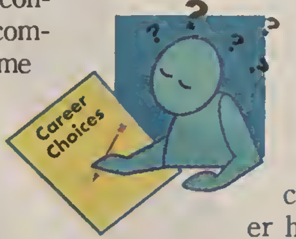
Information technology is where the jobs are, according to students considering an MBA. However, relatively few said they plan to concentrate in the MIS area, according to a recent survey.

The nationwide survey of prospective MBAs found that those students choose to study traditional business disciplines rather than areas they believe will lead to the best job opportunities for today and in the future.

The survey, sponsored by The Lake Forest Graduate School of Management in Lake Forest, Ill., involved 646 men and women aged 24 and older who had been in the work force for several years and had recently completed the Graduate Management Admission Test entrance exam.

Computer science in the lead

Topping the list of business concentrations surveyed was computer science, cited by some 55% of the respondents as the most marketable field in business today. MIS was second (of 10 business categories) at 45%.



However, while 15% of the survey participants planned to focus on MIS, less than 5% selected computer science as a focus.

Although MIS ranked second in current market opportunities, it dropped to seventh for future opportunities, beating out only finance, accounting and marketing. It was sixth in "enjoyment," ahead of energy, waste management, health and accounting.

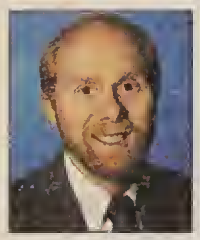
The survey seemed to reveal a pleasure principle of sorts: Some 33% of the students planned to study subjects they felt they would enjoy, compared with only 14% who said they are choosing concentrations they consider highly marketable and that offer good pay.

Marketing was rated the "most enjoyable" career pursuit but with the least chance for career success. Only 25% said marketing offers opportunity in today's market, and only 15% said it will be a fertile field for the future.

COMMENTARY

Glenn Rifkin

Peterson won't be forgotten



This month, IS's "Million-Dollar Man" will head off west into the sunset. DuWayne Peterson, Merrill Lynch's legendary chief information officer, is retiring, and in a profession with precious few heroes, it would be shameful to let him go without a tribute.

There's no doubt that Merrill Lynch will throw a lulu of a party. Peterson himself said his greatest regret is leaving behind the wild shindigs that Merrill Lynch throws at the drop of a hat.

But how about the rest of the information systems field? How does it say good-bye to a truly memorable CIO, whose name, along with that of American Airlines' Max Hopper, became synonymous with IS success and who unabashedly touted his seven-figure annual salary just to show that anything was possible for someone in the computer world?

Let's not get all misty-eyed here. Peterson isn't dead, after all, and he isn't off on a long cruise in the South Seas.

He is a vigorous, athletic 59-year-old, and he clearly does not need the paychecks. He said he completed the five-year mission he signed up for at Merrill Lynch in 1986, and he missed Southern California too much to stay in New York. He has signed a three-year deal to consult with Merrill Lynch, and he plans to remain an audible voice in the industry.

Still, it won't be the same. IS is at a critical crossroads today. Morale in the industry is generally low, and the ailing economy has refocused sharp attention on technology spending and return on investment. IS scapegoating is an art form, and high CIO turnover continues. It had long been a comfort for anyone in IS to say, "Hey, things can't be that bad if DuWayne Peterson is making a million bucks a year as an IS guy."

It is one of the injustices of corporate America that salary is equated with success, but Peterson gave IS professionals something to shoot for, a reason to believe in themselves and their profession.

Peterson talks candidly when he speaks about IS. "The IS function is under a lot of review and stress," he said. "And a lot of guys are not making the cut."

He blames chief executive officers for not getting more involved with technology. "There are still people not being accepted in the executive suite because they're the 'computer person.' The CEO has to spend more time on this because he can't keep firing CIOs like they were managers of the Yankees," Peterson said.

Rumors abounded that Peterson was another firing casualty when he announced his retirement plans in January. But at a recent IS symposium at the University of California at Los Angeles, Peterson insisted nothing could have been further from the truth, and from this vantage point, there is little reason to doubt him. Merrill Lynch is having excellent financial results smack in the middle of the recession, and the company's IS function has been made lean and effective after a difficult turnaround.

"We took $300 million out of the IS budget, cut the number of personnel from 15,000 to 10,000, and earnings, along with the stock, have gone up," Peterson said. "Did IS make that happen? They blamed me for problems in the past, so I'll take some credit for the success now."

What Peterson did best was recognize how to best implement his IS vision. At Merrill Lynch, as at Security Pacific and Ford before that, he learned early on how to establish rapport with the people who mattered most.

When he left UCLA's graduate school of management with an MBA in 1961, he took a data processing job at Ford. "My first job was to forecast sales of a funny-looking little car called the Mustang for a guy with a brush cut named Lee Iacocca.

"I sat down and concocted a bunch of numbers and came up with a forecast of 85,000 cars sold in the first year. Iacocca looked at me and said, 'Peterson, if I don't sell more than 85,000 of these @#$$!!@# cars, I'll eat my hat.'

"So I went back and redid my forecast. This time, I came up with 200,000 cars. That first year, they sold 475,000 cars, and one day, when I passed Iacocca in the hall, he turned to me and said, 'The next time I need a forecast, I'm not coming to you.' "

He admitted that his job was made easier at Merrill Lynch because he was hired by a group of people "who wanted me to succeed." He suggested that CIOs considering new positions take a close look at the management team.

"Check out the lineup," he said. "See who's in place and how long they've been there. It will give you a good idea of the stability of the situation by knowing how long they plan to be there. If the CEO is getting ready to retire, forget it, because the power structure goes into chaos whenever the chairman steps down."

This time, Peterson is stepping out before any new chaos can engulf him. Undoubtedly, new heroes will emerge in the IS field, but it will be a long time before anyone worth his code will forget IS's "Million-Dollar Man."

Rifkin is a free-lance writer and a former *Computerworld* features editor.

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Vallario

CONTINUED FROM PAGE 53

wholesale drug business, and it is hard to find a trade journal story or *Wall Street Journal* analysis that does not attribute the $4.4 billion company's success in large part to Vallario's IS department.

His long and sometimes stormy tenure as IS leader began not long after Vallario realized he could not live out his days as "just another worker at a drafting table." Until then, he had focused on becoming an aeronautical engineer.

Vallario had attended an aviation trade school, joined the U.S. Marine Air Corps and graduated from the Academy of Aeronautics in New York. While working a day job at Cody Cosmetic Co. in New York after the war, however, he found himself fascinated by the office machines and organizational principles. "I was in awe of it," Vallario says. "What did all these people do? My focus was drafting, but all this held an intrigue for me."

Cody had just started a primitive data processing department — or tabulating department, as it was known in the punch-card era — and he transferred to it, Vallario recalls. Although the department was little understood and lacked leadership, it gave him a taste for computing.

"Tabulating was new," he says. "It had a lot of tie-ins to other industries." Just as important, it offered him the chance to become a leader. He saw what went wrong at Cody and thought about how he would use the technology and run a department of his own differently.

That was the groundwork for a career choice that would last more than 40 years. Vallario still remembers the exact wording of Bergen Drug Co.'s want ad seeking a tabulation supervisor in Hackensack, N.J.: "Looking for an assistant supervisor for a young, aggressive company for the development of our tabulating department."

Although he interviewed with Bergen President Emil Martini Sr., it was with Emil Martini Jr. that Vallario built a four-decade partnership that has become as legendary in IS circles as Hope and Crosby in movie musicals.

Vallario "certainly is a leader," says Martini Jr., who started as a Bergen Brunswig buyer in 1953 and today is chairman of the board.

The mutual admiration has not gone unnoticed. Vallario and Martini shared a Partners in Leadership award last year from the Society for Information Management and were cited for their relationship as much as their "coupling of information technology with business strategy to achieve corporate objectives."

Not that there have not been creative tensions. "Tony gets noisy and excited," says Joseph Izzo, a veteran IS consultant who has worked on an occasional basis with Bergen Brunswig for a decade. "He's got a volatile personality."

Izzo, now vice president of information technology at Chicago-based A. T. Kearney, Inc., says Vallario can be "difficult to work with . . . very argumentative and opinionated." His saving grace is that he is unendingly loyal to Martini and capable of compromising for the good of Bergen Brunswig, Izzo says. "If they had to be a little tolerant of Tony, he was very unselfish in return," he says.

In 1973, Vallario's team developed the Pharmacy Automatic Systems Entry, a handheld order-entry terminal for pharmaceuticals retailers. With the machine, each retailer could couple the terminal with a phone at the end of each day, type in a command, and order new drug supplies. A backup system would be needed in case a pharmacist's terminal went down, Martini said.

Placing a second device at each store was too expensive. However, Vallario suggested a system that would allow retailers to order using their Touch-Tone telephones alone, Martini recalls.

"I said I wanted that system up in 90 days, and it was up in 90 days," Martini says. Martini and Vallario have reduced paper-based orders to less than 10%. Bergen Brunswig is now building a series of distribution plants that take, stock, process and load customer orders without human intervention.

Coping with rough times

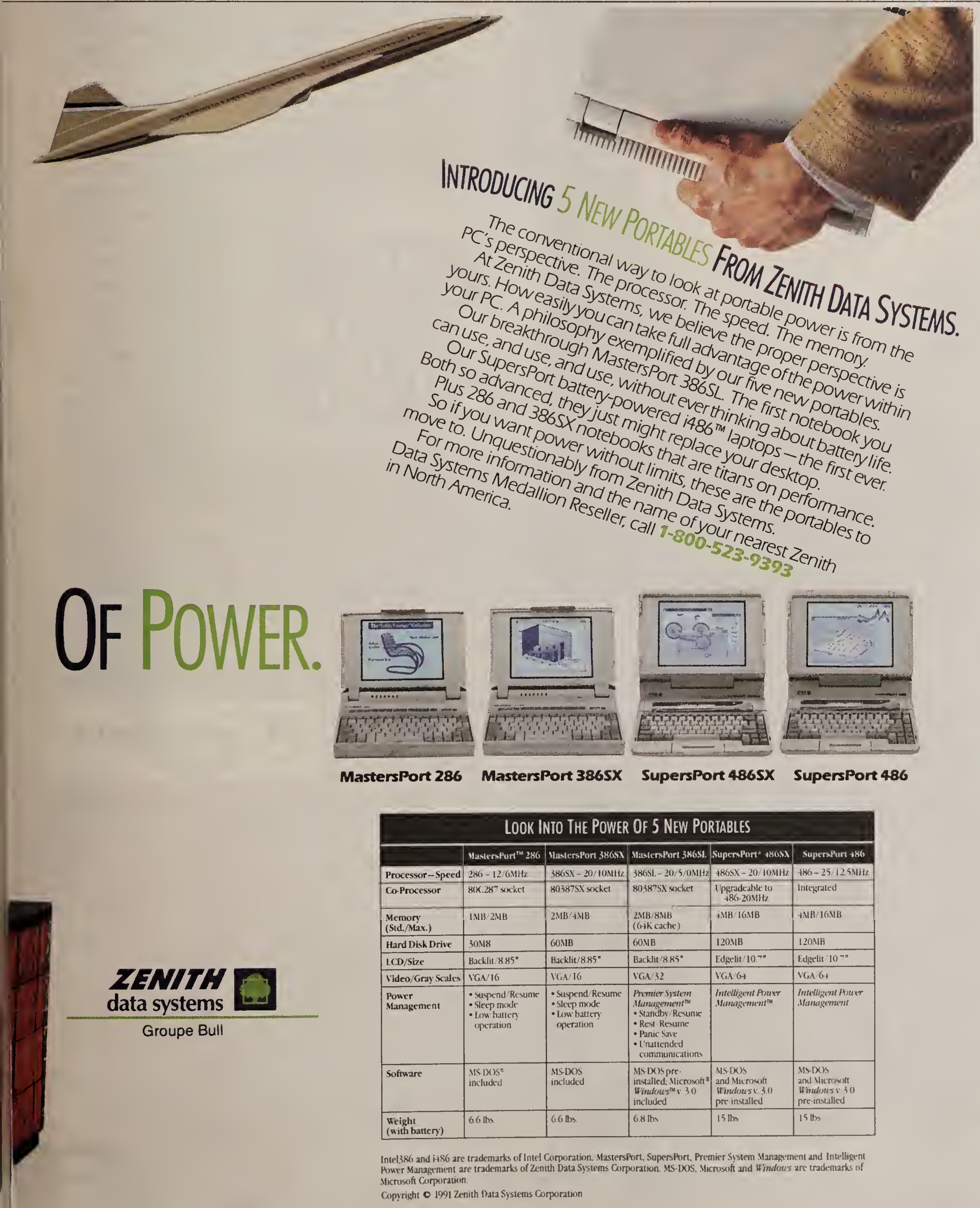
Vallario may be outspoken, but he has been able to delegate responsibility when necessary. The company went through at least one rough period in the 1980s, trying to carry out current innovations while watching the horizons for the next move.

"Those were the noisiest, stormiest meetings," says a source who participated in Bergen's operating team and asked not to be identified. Nothing was getting done amid the rancorous debates. "Tony knew he was part of the problem," the source says. "And even though he thoroughly disliked the notion of calling on consultants, he suggested one be hired to point [the team] in the right direction."

The success born in this contentious process cannot be dismissed, not even by competitors. Jon d'Alessio, staff vice president and chief information officer for drug distribution market leader McKesson Corp. in San Francisco, says that Bergen Brunswig "is a real tough competitor. They've been nipping at our heels the whole time; if we had a couple more competitors like them, we'd be in trouble."

In his retirement, Vallario plans to write a book aimed at newcomers to IS. Despite the current hubbub about the CIO position as a potential chief executive officer breeding ground, Vallario says he is not disappointed that he never rose to the leadership of Bergen.

"I achieved the heights of what I wanted to attain," he says.



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Here come the hybrids

The latest shape for IS organizations is a mix of centralization and decentralization

Stan Wolenski

FMC's Gannaway *freed divisions from worrying about routine IS tasks by 'recentralizing' certain operations*

BY ALICE LAPLANTE

Twenty years ago, 3M Co. in St. Paul, Minn., was like most other information systems shops: a centralized glass house. "Everything was done there," recalls Carl Kuhrmeyer, chief information officer and vice president of administration at 3M.

As the firm diversified and operations grew more and more decentralized, however, IS followed suit. Today, 3M boasts a complex matrix of business and technology functions spread out among its more than 50 operating divisions.

Although each division handles its own information processing, 3M never decentralized its main data centers. "I think we were looking far enough ahead to understand that would be utter chaos," Kuhrmeyer says. "We . . . never decentralized further than was absolutely necessary."

As it turns out, 3M was right on the money.

After years of frenzied decentralizing — spinning off data centers, applications development teams and end-user support staffs for various business units — many IS shops are reconsidering the shape of their organizations.

Although most companies have no desire to recreate the traditional IS fortress, an increasing number are now looking to a combination of decentralized and centralized IS to get the biggest technology payoffs.

"Firms now realize it is absolutely critical to strike the right balance between those activities that can best be done centrally, such as architectural or infrastructure functions, and those that should be integrated into the business units," says Dudley P. Cooke, a veteran IS manager and president of The Executive Insight Group, a consultancy in Bryn Mawr, Pa.

Indeed, a poll of 1990 *Computerworld Premier 100* winners — firms chosen as the most effective users of information technology — found that 60% have adopted a hybrid IS structure that combines centralized and decentralized elements (see chart page 60).

Big names such as Sears, Roebuck and Co., AMR Corp., Caterpillar, Inc., Baxter International, Inc. and Xerox Corp. are among the growing number of U.S. corporations that have chosen the hybrid approach. Many IS consultants say they believe that the percentage of firms employing such flexible new structures will increase in coming years.

Cooke, a former CIO at Sun Co. who engineered an IS restructuring, says he sees dozens of companies that have taken decentralization too far and are now "recentralizing."

While fewer companies are restructuring their IS operations compared with one year ago, still nearly one in four companies polled are doing so, according to a recent survey by Index Group, Inc., a Cambridge, Mass., consultancy.

Among the recentralizers is FMC Corp., a Chicago-based contractor and manufacturer now moving to cut costs by consolidating several divisional computer operations.

"We want the divisions to retain as much local control as possible without having to worry about computer operations and other things that are irrelevant to their business," explains Randall Gannaway, director of the corporate data center at FMC (see story page 59).

Paine Webber, Inc. in New York has devised an innovative structure that mixes technology-savvy business people and business-smart technologists. The process fosters "healthy contention," says Robert Benmosche, executive vice president and director of systems operations and administrative services (see story page 58).

Even 3M is still evolving. The diversified manufacturer is instigating a centralized "IS strategic review" process that will attempt to better coordinate and manage technology in its highly autonomous divisions (see story page 59).

Urge to remerge

The criticisms against highly centralized IS groups are widely known: sluggish response to rapid business changes and indifference to end-user needs.

"The demand for decentralization was a very healthy sign," says N. Dean Meyer, president of NDMA, Inc., an IS management consulting firm in

Continued on page 58

Centralization Decentralization

Key points

- ▶After years of decentralizing, many information systems shops are re-examining and recentralizing operations.
- ▶Hybrid mixes of decentralized and centralized IS groups are gaining popularity. Some 60% of 1990 *Computerworld Premier 100* winners use this structure.
- ▶Small and medium-size companies face many of the same tricky organizational questions that larger organizations face (see story page 60).
- ▶More senior IS executives (35%) now report to top business officers, such as the chief executive officer, president and chief operating officer, than to the chief financial officer (33%), according to an Index Group, Inc. study (see story page 59).
- ▶Case studies of Bankers Trust Co., Paine Webber, Inc., FMC Corp., Union Texas Petroleum Corp. and 3M Co. begin on page 58.

▶QUOTABLE:

"Users don't want to manage techies or run computer service bureaus."

N. DEAN MEYER
NDMA, INC.

LaPlante is a free-lance writer based in Palo Alto, Calif.

Continued from page 57

Ridgefield, Conn. Meyer says the push to decentralize meant users were beginning to appreciate the value IS could bring to their day-to-day work lives.

Yet there is an emerging realization that decentralization is not a panacea for IS management woes. Big cost overruns from multiple data centers in business units, skyrocketing software site license fees and duplicated services helped burst the bubble. So did the many difficulties in managing decentralized personnel, including unequal pay scales, isolated workers and lack of career paths.

Add to those problems poor communication between business units, parochial thinking and end users who often got bogged down in routine IS operation issues, and it's easy to see why many companies began looking for a better way. The last point is ironic. In the name of efficiency, business units demanded control of IS functions. Yet many became less efficient at carrying out responsibilities. "Users don't really want to manage groups of techies or run computer service bureaus," Meyer says. "Yet that's what many of them ended up doing."

New centralization

As a result, centralization is now popular again. The new centralization takes several forms: consolidating data centers, setting up centralized strategic planning and architectural committees and setting up complex "dotted-line" matrices for overseeing hiring, training, promotion and purchasing for operations scattered around the nation or even the globe.

No one is getting too carried away, though. Part of the hybrid movement is to keep many functions decentralized.

Applications development teams, for example, are now frequently placed in the business units they serve. In such instances, project priorities and budgets are set by the business community. True, big-systems decisions are still being made by central IS, but the explosion of personal computers, local-area networks and departmental computers is increasingly being managed by business departments.

Needless to say, such changes require careful overseeing at several different managerial levels. "To make this work, IS must have discipline," says Norman Weizer, a senior consultant at Arthur D. Little, Inc., a Cambridge, Mass., consulting firm.

Weizer says many hybrid companies are creating executive committees and management teams made up of business and IS managers. The idea is to ensure that a critical cross-pollination of ideas and efforts takes place throughout the organization. Such idea sharing is increasingly happening at lower levels in the organization, Weizer adds — a good sign.

Consultants and IS managers are also quick to point out that there is no recipe for the perfect hybrid: Each business must find its own balance based on its overall corporate organization, industry competitiveness and market challenges.

Moreover, flexibility remains a key word: What works today won't necessarily work tomorrow or next week.

"It's going to continue being an evolutionary process," says Bill Strapko, a senior consultant at International Data Corp. in Framingham, Mass. "Of course, IS will continue facing the age-old problem of giving users what they want, not necessarily what they ask for. Some things will never change." •

Winning shapes

Many companies that started down the road toward decentralization in the 1970s and 1980s are now pausing to think.

Some have changed direction, others have kept moving ahead, and still others have taken two different paths.

Computerworld recently asked five 1990 *Premier 100* firms a simple question: "How is your IS department organized and why?" Their illuminating answers follow.

— ALICE LAPLANTE

Bankers Trust trusts users to control bottom line

Tired of complaints that slow response was hurting the bottom line, the information systems staff at Bankers Trust Co. made business managers put their money where their mouths were. Literally.

Six years ago, the New York-based financial institution decentralized its IS operations and gave individual business lines complete control over its systems operations and decisions. The bellyaching quickly ceased.

"We no longer hear from business managers that they can't meet their goals because centralized IS didn't deliver," says company Vice President Anish Mathai.

Other benefits became apparent. Besides a drop in complaints, the applications backlog was eliminated. The business groups were also able to more quickly embrace emerging technologies appropriate to their specific needs.

Today, Bankers Trust retains a small centralized IS staff that employs 120 of the bank's 1,400 IS employees. Mathai has no doubts that the choice was correct.

"Bankers Trust has such a broad range of widely divergent services that we knew the only effective way of doing this was to put the technology as close to the business line as possible," Mathai says.

Joyce Ravid

Mathai: *'We wanted our applications developers to live and breathe the very specific business issues'*

Each of Bankers Trust's three business groups is further subdivided into more than a dozen business lines, each of which runs its own IS operations.

IS staffers in each business unit work for the unit and report to the head of that particular organization. "We wanted our applications developers to live and breathe the very specific business issues of each particular line," Mathai explains.

A small Technology Strategic Planning Group sets broad policy standards and runs the telecommunications facilities. Through it all, there is "constant communication" between the centralized architects and their counterparts in the business units. However, it's clear the businesses are in the driver's seat.

A key goal of the approach is to shorten development cycles. "We found from experience that the longer the deliverable time frame, the higher the probability that an application won't meet user requirements at the time it is delivered," Mathai says.

The careers of IS workers in Bankers Trust's decentralized structure don't suffer because each IS department is large enough to offer opportunities, he adds. "If you only had five or 10 IS employees in each unit, that might be a problem, but there are hundreds."

Resources widely stretched

Mathai also disagrees with criticism that a decentralized organization "dilutes" the technical specialization of IS staff members. On the contrary, the centralized IS groups are more likely to employ "jacks-of-all-trades," he says.

"A great deal of our ability to implement effective solutions is that we have excellent technical specialists in each business department," he says. "It's very unlikely that a centralized group would have that kind of expertise."

It's also unlikely that a centralized group would be able to get its priorities totally in sync with the business line it supports, he adds.

Getting it all together can be a problem, Mathai acknowledges, but he also notes that Bankers Trust has no need for a central corporate database or repository.

Mathai says he expects Bankers Trust will continue to refine its organizational structure as domestic and international strategies change. "I expect we will nearly always be in a state of flux," he says. •

Paine Webber's silent credo: Conflict is good — to a degree

At Paine Webber, Inc., the unofficial IS credo might be summed up as: "Conflict is good." Robert Benmosche says he believes a certain amount of conflict helps an information systems organization thrive.

"You want healthy contention," says Benmosche, executive vice president and director of systems operations and administrative services. "You want to make sure that both sides are pulling in slightly different directions.

"It's a balancing act, and there is no necessarily right solution other than [that] you have to keep focused on the future," he continues.

To help keep creative tensions optimally high, Paine Webber has developed what Benmosche calls a team-oriented, "push-me/pull-you" organizational structure in the IS department.

Each line of Paine Webber business — finance, human resources, capital markets and investment banking — has individuals who look after the technology needs of that particular division, Benmosche says.

However, the actual applications development takes place in central IS and is handled by technologists who specialize in a particular line of business. The two groups of specialists are cast together and told to devise the best solutions for each business unit, Benmosche explains.

Through it all, there is strong central control. "I feel very strongly that we need to eliminate data redundancies and that we require a great deal of centralized synergies," he says. "At the same time, you need to be responsive to the business units. This is what works for us."

Benmosche says he sees the question of IS structure as less of an organizational issue and more of a knowledge issue. It's no surprise that he is an avid believer in cross-training in both technology and business for all IS employees. He says he considers it imperative that mainframe programmers learn about the personal computer world and vice versa.

"If you create an organization that is flexible enough, then people can solve any problem," he says.

Part of this philosophy includes putting the entire IS staff through an intense series of courses on the brokerage business.

Participants are taken to the stock exchange floor and taught to perform trades, and then they are shuttled to branch offices to see how brokers interact with clients.

There's more to come. "We're just starting what is going to be a very thorough educational process for everyone concerned," Benmosche says. •

Centralized Union Texas successfully flexes

Union Texas Petroleum Corp. doesn't believe that centralization means being unresponsive.

Indeed, MIS director Richard White says the Houston-based oil company has gone to great lengths to counter the real dangers of a centralized information systems department.

"We have a highly involved user community," he says, "and I believe we've been successful at staying very close to our business." The IS structure at the company reflects the larger corporate structure: simple, straightforward and highly centralized.

Union Texas has approximately 1,800 employees, 900 of which are located at headquarters. The rest are scattered throughout oil exploration and manufacturing sites around the world. Because most key executives are based in Houston, strategic business planning decisions are made there, White says.

Unlike many corporations, White explains, Union Texas never diversified from its original business as an oil and gas exploration and production company. Thus, a tightly focused structure makes sense, he says.

White says it didn't make financial sense to locate data centers or permanent IS departments in remote sites — even when the rest of the IS community was rushing to decentralize such operations. "It simply wouldn't be economical," he says.

Instead, IS workers are sent when necessary on short assignments to different locations to install new technologies developed at headquarters or to troubleshoot operational problems.

Other remote assignments — particularly those involving international travel — can last up to nine months. But White always rotates workers into such positions, encouraging everyone on his staff to take turns at such jobs. "We do a lot of cross-training because we like to have as fully rounded and knowledgeable a staff as we can," he says.

Still, White bucks the trend of decentralizing applications by keeping developers at IS headquarters.

Acknowledging the need to stay as close as possible to the business, developers are organized into dedicated teams serving the firm's domestic, international and hydrocarbon businesses.

White says there is another good reason for centralization. "We have a centralized database that holds geological and geophysical data, which is something that a lot of our technical folks need access to," he explains. Moreover, applications often require coordination between the various business lines.

Mark Green

White bucks *the trend toward decentralization by bringing users into IS instead of bringing IS to users*

Involving users

Even so, Union Texas is continuing to take steps aimed at further involving the user community. A non-IS project leader is assigned to each development project, for example.

The approach is consistent with White's philosophy of bringing users into IS instead of bringing IS to users.

Union Texas has also established a user committee to improve communication between business and IS groups. Called the MIS Operation Committee, the group is headed by the company chairman. It oversees all IS projects and sets IS priorities and development schedules.

Besides White, the group includes the vice presidents of the three business units, who take active roles in defining the part technology plays in their organizations.

Each business unit also has its own "super users" — people assigned to keep track of emerging technologies that relate to particular businesses. •

3M Co. means matrix, matrix and more matrix

With a product line that includes Post-it notes, Scotch Tape, paint stripper, medical diagnostic equipment, floppy disks and hundreds of other items, 3M Co. officials say the only structure that makes sense is a classic matrix.

"We have so many different customer groups and classes and our product lines are so diverse that we need to be organized this way," says Chief Information Officer Carl Kuhrmeyer.

Practically speaking, that means Kuhrmeyer routinely meets with the business head of each operating unit, as well as the divisional information systems managers, to solve any IS problems. What gets worked on is left up to divisional business management, however.

Each divisional IS manager has an ample degree of autonomy and reports to the head of the business unit, he explains.

Built into the matrix approach is frequent interaction with other departments. A dedicated human resources person, for example, looks after IS human resources issues, making sure pay scales and promotion policies are consistent in IS organizations throughout 3M.

Such cross-pollinating also works whenever Kuhrmeyer or other senior 3M managers see an application at one plant that could be used at another.

Even so, 3M still struggles with a problem often faced by decentralized companies: how best to leverage independent technology efforts taking place in separate operating businesses.

Last month, the company instituted a way to improve coordination among the massive IS operations at 3M sites around the world.

The plan revolves around a strategic review process for all IS functions in the corporation. IS directors from each division were brought in and asked to review their strategic plans for the coming year.

Equally important, IS directors had a chance to look for opportunities to work together, Kuhrmeyer says. •

Power to the people at FMC

Management philosophy puts power in divisions' hands

FMC Corp., a $3.4 billion diversified manufacturer, has a complex corporate structure and an information systems organization to match.

The company's chief information officer is located at corporate headquarters in Chicago and is directly responsible for corporate technology planning and coordination.

The data center and telecommunications functions are located in Dallas, where network architecture standards are also set.

Yet FMC has more than 30 divisions in a range of businesses, including chemical, defense and gold mining, with a total of hundreds of offices worldwide. Each division has its own local applications development organization, operations staff and IS manager.

Divisional IS managers report to a group IS manager, who in turn reports to the CIO.

"FMC's management philosophy in general is to put power in the hands of the divisions," explains Randall Gannaway, director of the corporate data center.

The IS staff in each division is employed by that division; there is a dotted-line relationship between each divisional IS manager and the CIO in Chicago.

Although the CIO has an influence on general directions, Gannaway says, each division is fairly autonomous. This freedom, he adds, is tempered by economic considerations and concern about overall architectural issues.

Mainframe still centralized

Largely because of the expense, FMC never decentralized its mainframe operations. More recently, after years of having each business division install and maintain its own computer operations, the company decided to combine larger minicomputer and midrange systems in its corporate data center in Dallas.

"This is primarily driven by economies of scale and cost-reduction goals," Gannaway explains. "But there are also a number of other benefits."

Foremost is that divisions will be able to refocus on applications development instead of routine IS operations, according to Gannaway.

Then there are the cost savings. "With the advent of distributed processing, we realized there was a virtual hole in the dam," Gannaway says. "A lot of processing was going on in the divisions that could more effectively be done here."

The company decided to consolidate Hewlett-Packard Co. and Digital Equipment Corp. systems while leaving personal computers and local-area networks under divisional control.

FMC officials are hoping the move will not only yield economies of scale but also permit the company to "follow a newer technology curve," reduce unit and service costs and boost overall efficiencies, Gannaway explains.

"We're trying to eliminate the amount of time [users] have to worry about routine operations so they can focus their energy on what really matters," he says. •

Who's the boss?

While philosophical debates rage over the best shape for an IS organization, one fact remains unquestioned: Computer professionals must still report to a higher authority.

Increasingly, the chief information officer is no longer entirely under the thumb of the chief financial officer, according to Index Group, Inc. In fact, the Cambridge, Mass.-based consulting firm says, more senior IS executives (35%) now report to top business officers such as chief executive officers, presidents and chief operating officers than to CFOs (33%).

According to a recent Index Group survey of 394 top IS executives, IS reporting relationships break down this way:

CFO	33%	Vice chairman	4%
Chairman/CEO	23%	Vice president (other)	4%
COO/President	12%	Vice president, corporate services	2%
Executive vice president	7%	Corporate vice president	1%
Senior vice president	6%	Other	4%
Vice president, administration	6%		

Note: Percentages rounded off to nearest whole percent.

Following the striped line

Noted IS academic's hybrid model enhances decentralized centralization

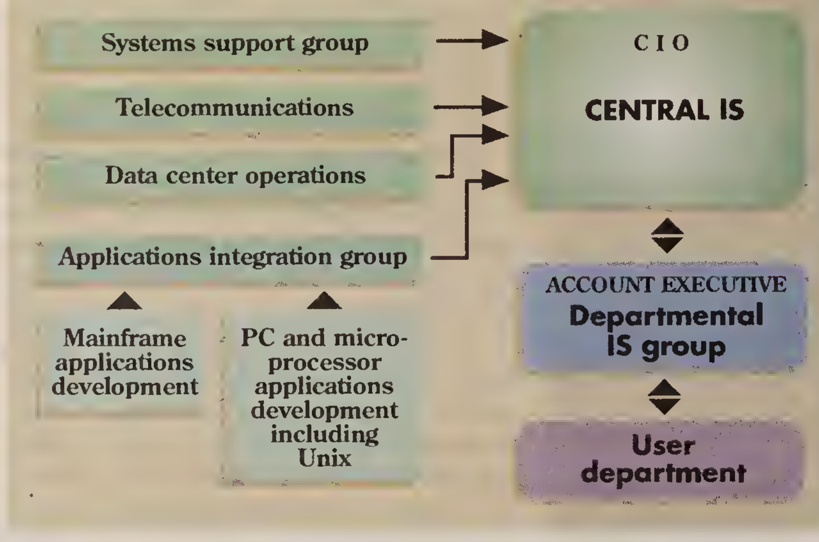
BY JOSEPH MAGLITTA

If there is a single, influential document that cemented the popularity of the hybrid information systems structure, it is undoubtedly "The Centrally Decentralized IS Organization."

The now-classic manifesto was written by Ernest M. Von Simson, a senior partner at the Research Board, a New York think tank, and appeared in the July/August 1990 issue of *Harvard Business Review.*

Many consultants and academics have written about the best structures for IS effectiveness. But the author's reputation, coupled with the article's appearance in the hallowed business journal, helped Von Simson's ideas gain a credence enjoyed by few other theorists.

Today, nearly one year after the publication of the article, the author is mum about new perspectives on the work. A request made to his New York office for an update on the work was politely declined. "Mr. Von Simson has said everything he'd like to say in the [*Harvard Business Review*] article," said an assistant, who added that the author was finishing new research on the subject.



The hybrid organization

A model from the Research Board centralizes IS functions such as applications development while assigning a decentralized IS group to each user department

CW Chart: Doreen St. John

Until the new work is made public by the Research Board, a secretive private organization sponsored by 80 large users of information technology, the IS community will have to be content with chewing over the previous piece.

Hybrid model

For his earlier work, Von Simson and his colleagues visited 30 member companies: 10 in manufacturing; 10 in finance; and 10 in transportation, retail and engineering. Researchers interviewed IS senior executives as well as chief executive officers and corporate end users.

Von Simson devised a hybrid model of an IS structure that combined the best features of decentralized and centralized approaches (see chart at left). By adopting elements of the approach, Von Simson wrote, IS organizations could get the best of both worlds.

In his model, a central IS group selects hardware standards, operating systems, database systems, networks, computer-aided software engineering strategies, applications development systems and other tools. Human resources issues such as recruiting, training, promoting, transferring and firing are also handled by central IS.

However, user departments also play a key role, setting IS priorities and establishing cost ceilings, functioning as a kind of substitute chief information officer. An account executive acts as a liaison between central IS and the user department.

"If a solid line symbolizes reporting relationships in the traditional centralized IS organization," Von Simson wrote, "and a dotted line those of the decentralized alternative, then this new model requires what might be called 'striped-line reporting,' with genuine power sharing between IS managers and users."

IS efforts would be supported by special groups to handle applications integration and development, data center operations, telecommunications and systems support. These groups would report to IS.

Organizations that implemented these ideas could expect the cost savings and control of centralization plus the user responsiveness and flexibility of decentralization.

In presenting the model, Von Simson emphasized that the findings apply to multibillion dollar corporations but not necessarily to smaller corporations.

Today, an increasing number of IS organizations resemble Von Simson's model. Many organizations that were moving toward a hybrid structure have continued doing so, while others were prompted to begin experimenting with the new approach.

Other recent publications of interest include the following:

- *The Corporation of the 1990s: Information Technology and Organizational Transformation.* Edited by Michael S. Scott Morton. Oxford University Press, $24.95. The 331-page result of MIT's Sloan Business School's "Management in the 1990s" program contains nine essays that can impact IS structure.
- *Strategic Alignment: A Model for Organizational Transformation via Information Technology.* By John Henderson and N. Venkatraman. MIT Center for Information Systems Research, Working Paper, 1990. Another MIT effort that states using IS for competitive advantage requires, among other things, a careful examination of IS and business unit structure. ●

Maglitta is a *Computerworld* senior editor, executive report/integration strategies.

Small firms not immune to structural wrangling

BY MARTY LEVINE

Life in a small-company information systems department would be idyllic and largely free from troublesome wranglings over organizational structure, you might think. Unfortunately, the exact opposite is often true.

While many large corporations have made significant progress in resolving structural tensions between IS groups and end users, the struggles continue unabated in many small and medium-size organizations.

In many cases, control over information services often remains a political tug-of-war, pitting user departments eager for technological autonomy against the "big picture" objectives of centralized IS departments.

"The capabilities and use of technology have evolved at a faster pace in user groups than in central data processing groups," says Ron Pharis, an IS consultant at Boise, Idaho-based Prodata, Inc. He sees the growing independence of small-company users as the root of many structural disputes.

While the struggle sounds familiar to any large-company IS manager, it may be more intense in small organizations, which can trail their larger counterparts in instituting reforms.

Some small-company IS managers have struck a compromise between centralized and decentralized operations. This means individual user groups control function-specific applications such as accounting but adhere to strict standards for commonly shared information.

A good mix

"We have a mixture," says James Dean, director of MIS at Cooper Energy Services Group in Mt. Vernon, Ohio. Cooper manufactures large engines and compression equipment for the gas and oil industries.

At Cooper, some desktop applications such as shop floor control, computer-aided design and manufacturing and office systems are distributed. "But they all send data to the mainframe," Dean explains.

Some very small companies have managed to avoid structural problems. A good example is R. S. Tipton, Inc., a 15-employee software consulting firm in Littleton, Colo.

The five Apple Computer, Inc. Macintoshes that form the core of the company's data processing system are linked over one local-area network. Each department handles its own data processing, and there is little interaction or information sharing among groups.

Regardless of what structure is used, some small-company users say the dynamics between IS and end users won't change much. "This is still a struggle between the need of individual user groups to solve their own needs and the larger requirements of the corporation," Pharis says. ●

Levine is a free-lance writer based in Forest Hills, N.Y.

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Facing an age-old dilemma: Who to put where, and why

BY JOSEPH E. IZZO

No single structure is right for every information systems group — needs vary greatly from enterprise to enterprise. But factors such as company size and complexity of product line can be big determinants for arriving at the most effective approach.

One of today's most popular structures is a mix of centralized and decentralized structures. Who is a good candidate for a hybrid structure?

For starters, companies that have multiple, independent product lines but common support functions are in a good position to combine elements of both approaches.

For example, a company that has a common sales force, distribution group and warehouse but has 10 different products might do well to use both a centrally managed mainframe and separately managed minicomputers in the independent business units.

Because data is shared, centralized planning and leadership for standards and common systems is critical in hybrid companies. Each individual product unit can build its own systems with minicomputers to operate autonomously, however.

The bottom line is this: When it comes to IS structures, one size doesn't fit all. Regardless of the current trend, it also pays to look carefully. ●

Izzo is vice president of the information technology group at A. T. Kearney, Inc., a consulting firm in Chicago.

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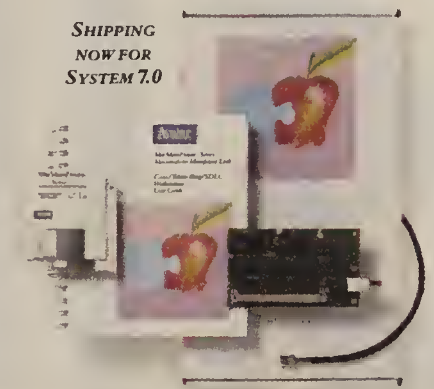

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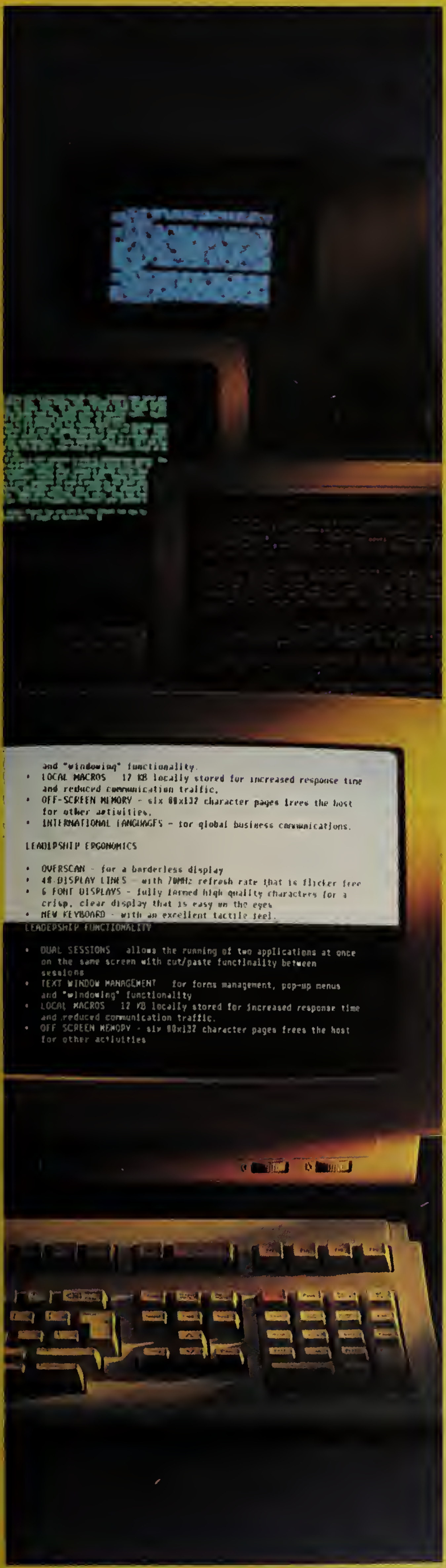

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Legal writes

Issues such as data sharing, vendor alliances and code reuse will change the face of computer law in the next decade. Here's what to expect.

BY MARK RADCLIFFE

The development of computer technology over the next decade will present important challenges to the development of computer law. The next 10 years will bring network growth and increases in the customization of systems and software. There will be more vendor alliances, greater standardization and an upsurge in the sharing and reuse of previously developed program code.

These trends are already beginning and, even at this early stage, are creating legal quandaries the computer industry and legal profession must deal with. How these issues are resolved will determine users' rights as well as vendors' responsibility in cases in which their products fail to perform.

Legal complexity: The networked software environment. As software moves off stand-alone machines and onto networks, the issues of ensuring a reasonable return for software vendors and establishing costs for networked software users are becoming thornier. For example, at this point, it is difficult to determine a reasonable royalty for network licenses.

The addition of another user to the network does not necessarily require the delivery of another program copy, and psychologically, few users will be willing to pay the same amount for additional use without a new copy of the program.

Furthermore, no satisfactory legal definition now exists of what a copy is in this networked environment. To be subject to copyright law, a copy must be "fixed" in a tangible medium of expression. Yet the fleeting existence of a copy on a network may test the meaning of "copy" and "fixed" under copyright law.

In fact, some systems do not create a copy of the entire program. Rather, they use a single copy of the program but allow multiple individuals simultaneous use by making only part of the program available to each person. How does the vendor recover the value of such use? Does that arrangement violate the vendor's exclusive rights under copyright law of reproducing or creating derivative works?

The use of networks raises difficult questions as well about the consequences of the interaction among different vendors' programs.

A recent court decision suggested that interactive programs may require a license from the copyright owner of the base program. In that particular case, Galoob Toys attempted to sell its Game Genie cartridge, which permits Nintendo players to alter certain features of the game, such as the number of lives of the main character. The court found that such alterations were an infringement of the copyright in the Nintendo game and that Galoob needed a license from Nintendo to sell its product.

This decision could permit vendors of major spreadsheet and word processing products to have much greater control over third-party add-on products, such as dictionaries or thesauruses that interact substantively with the base product. If the decision is correct, the vendors of the base product could prevent the distribution of such products or force the third parties to pay a royalty to the base product vendor.

Legal complexity: Vendor alliances and joint development projects. Customers are increasingly demanding software tailored to the way in which they do business. In response, vendors are forming alliances to provide more complete offerings. The Santa Cruz Operation's Open Desktop software is an example of software by alliance: It's a business package for the Unix operating system that combines the programs of several vendors.

Vendors are also responding by creating open-ended products that the customer may customize.

These changes in the methods used to develop, market and deliver connected systems are bringing about changes in today's standard software user licenses.

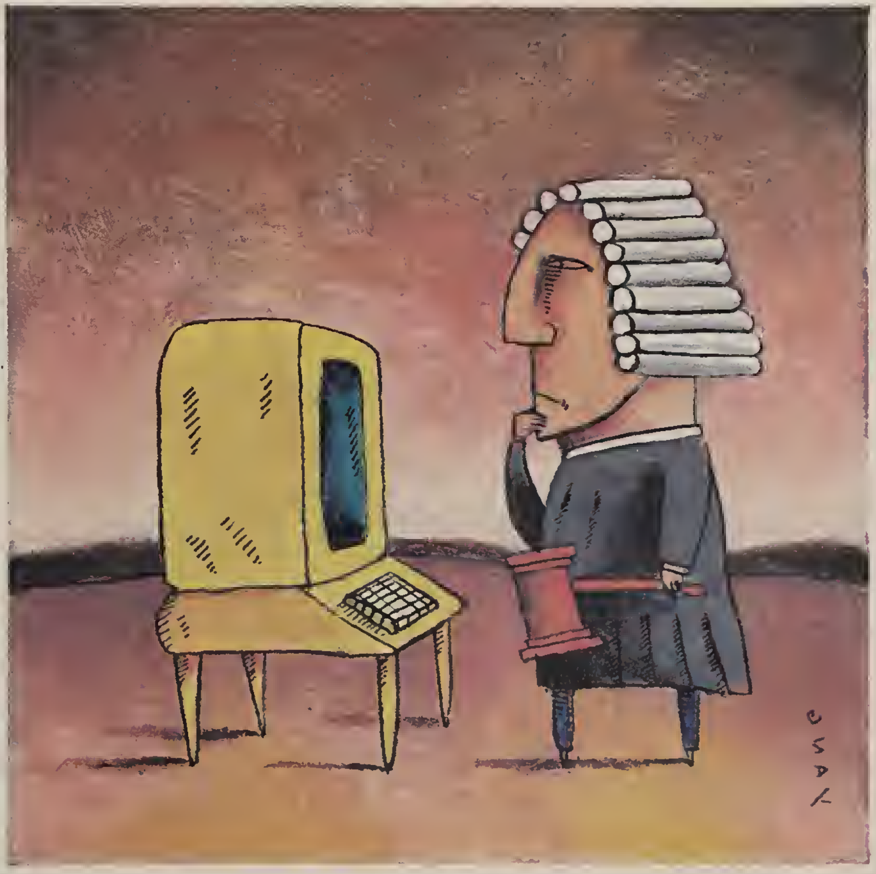
Most current user licenses cover a standard product that is the same for all customers, such as Lotus Development Corp.'s 1-2-3 or Wordperfect Corp.'s Wordperfect programs. Development agreements, on the other hand, are used in instances when users require modifications.

As more products become "open-ended," standard user license agreements will begin to resemble development agreements.

However, users must take special care in situations in which multiple vendors are involved in the creation of a complex, customized system. One critical legal question that arises concerns the liability for the reduced performance or even failure of a system that results from changes to a part of it. Which vendor is responsible if a revision to the software controlling a network analyzer doesn't work with existing bridge software?

Users can avoid problems by carefully drafting contracts that clearly assign responsibility and liability for changes.

Ownership of copyrights and other rights becomes even more complicated when the user gets involved in the alliance. In the U.S., the author (or, if he is a full-time employee, his employer) usually owns the copyright in a modification. Who owns the copyright in cases in which a vendor and a user work together to modify software? Where do you draw the line on ownership in the case of user-definable software a customer modifies without vendor involvement?



James Yang

These issues are important to the user because they determine how the user may use such modifications as well as who else may use them.

Another difficult challenge is deciding which development partner is liable for defects in a jointly developed product. In other words, how much participation in product

Continued on page 66

Radcliffe is a partner at Ware & Freidenrich in Palo Alto, Calif. He specializes in computer law.

Continued from page 65

development and manufacturing is sufficient to make a computer vendor liable?

Patents vs. copyrights vs. trade secrets

There's a difference between these forms of intellectual property protection

PATENTS:

- Protection is not obtained automatically; software patent process is an adversarial one in which Patent and Trademark Office examiners review the application and existing technology to determine if the application meets legal criteria of novelty, nonobviousness and usefulness.
- Protect the invention in a machine process.
- Have a limited term of protection (17 years) in return for complete disclosure of the invention in the patent application.

COPYRIGHTS:

- Protection is automatic – no need to apply for it, although the work must meet standard of originality.
- Protect expression, not ideas. For programs, protect only against substantially similar copies.
- Longer term of protection (minimum of 50 years) that provides return to creator that is sufficient to encourage disclosure of work to the public.

TRADE SECRETS:

- Any formulas, patterns or information used in business that confer an advantage because competitors do not know or use them.
- Trade secret owner must use reasonable efforts to maintain secrecy.
- Protection lasts until trade secret becomes known.

Legal complexity: Reusable code. The use of standard modules or reusable software objects in creating products is a breakthrough for developers, but it is also a legal problem. The trend toward code reuse has been accelerated through the distribution of tool kits for developing software and the rise of object-oriented programming, in which significant parts of a new program can be created from pre-existing software objects.

The incorporation of modules from such tool kits or objects into software raises legal issues regarding intellectual property and liability. These issues will be important for users because they will be using tool kits to create their own programs. For example, program developers might use tool kits to create common devices such as windows and scroll bars in new programs. They do not have to write all the code themselves. What kind of license grants does the third-party developer need? For example, Apple Computer, Inc. permits the use of its tool kits solely to create programs for the Macintosh environment. Once developed, these programs may not be ported to a DOS environment.

The use of these tool kits may also make difficult the determination of copyright infringement. Two vendors may use the same tool kit to develop a program with similar functionality (for example, a financial analysis package). Because each had the right to base its program on the tool kit, suing would be difficult.

The idea of derivative works also has a bearing on reusable objects. Under copyright law, a derivative work is that which is based on another work and incorporates a substantial part of the expression (not ideas) of the underlying work. But is the arrangement of objects in an original way a derivative work? Or do objects themselves actually have to be modified?

Liability is also an issue with reusable objects. For example, a software object may function properly by itself but not when used in a particular combination in an application developer's program. The question, then, would be whether this malfunction arose from the application developer's error or the object developer's error. If the object does not work properly in the application developer's program, it may cause considerable damage. If this damage is imposed on the object developer, it could easily exceed the royalties the object developer receives from licensing the object.

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In fact, legal problems involved in object-oriented programming, such as ownership, liability for use of objects and definition of derivative works, have in part delayed Japan's Sigma project, an effort to develop a national software object library.

Legal complexity: The rise of standards. Customer demand for standardization and the desire to increase market potential are leading a number of companies to open their proprietary technology.

This shift to open standards raises many questions involving legal protection and control. What form of legal protection is available to standards developers for a standard that may consist of a list of microprocessor commands or a description of an application program interface? Who controls and determines changes to the standard, both initially and as it develops? Who enforces it against third parties falsely claiming compliance?

These questions will be answered differently for different types of standards. What is certain, however, is that with the increasing use of combinations of products from multiple vendors and with the growth of standards, claims of compatibility are increasingly important to users. The legal meaning of the term "compatibility" is just beginning to be defined.

Three types of standards exist: public open, private open and private closed.

Public bodies such as the American National Standards Institute develop public open standards. Such standards may be used by any vendor. However, no organization has the responsibility (or, more importantly, the resources) to police vendors' misstatements about their compliance with standards. Any such enforcement must be undertaken by third parties, such as competitors.

Private open standards are owned or developed by private parties but are licensed to any third party. The DOS/Intel Corp. architecture, Sparc International's Scalable Processor Architecture (Sparc, derived from Sun Microsystems, Inc. work) and Motif user interface are examples of such standards.

The Sparc standard and Motif user interface represent a new trend in the computer field: They are developed, controlled and licensed by industry consortia specifically created to establish standards; compliance is determined by third parties.

Trademark law will play an increasingly important role in establishing standards compatibility. For example, the Sparc trademark designates compliance of products with the Sparc standard. Rather than individual vendors claiming to be compatible with a standard, standards-setting organizations provide neutral testing to determine whether a particular product meets the standard. If the product successfully passes the test, its manufacturer may then use the trademark identifying it as compatible with the standard.

A private closed standard is controlled by a private party and is not licensed to third parties. Examples include Lotus' 1-2-3 user interface and Apple's operating system. The *Lotus Development Corp. v. Paperback Software, Inc.* and *Apple Computer, Inc. v. Microsoft Corp.* cases suggest that attempts to achieve compatibility, or even comparability, with these standards will be challenged by their owners for the foreseeable future.

Legal complexity: The scope and type of intellectual property protection for computer software. For the last decade, the computer industry and legal profession have held that copyrights and sometimes trade secrets were the appropriate forms of legal protection for computer software. Computer programs were viewed as similar to copyrightable works such as books and films. Patents were rarely, if ever, granted to computer software because such programs did not easily fit into patentable categories.

Patents in the U.S. are only issued for inventions that meet the stringent patent requirements of novelty, utility and nonobviousness; the invention must be new and useful and should not be obvious to one skilled in the technical field at the time of its discovery. The nonobviousness requirement screens out inventions that are only minor or obvious improvements on prior work in the field.

In recent years, there has been a growing number of patents issued in the U.S. to protect program-related inventions. However, using patents to protect computer software is problematic for several reasons, including the fact that the patent application process can't keep up with rapid product development and short product life cycles. The process is also hindered by the U.S. Patent and Trademark Office examiners' limited experience with existing technology in the computer field.

Furthermore, the frequent use of secrecy to protect commercially valuable computer software means it is difficult to determine what is truly original and novel in this field. The patent process, because of its complexity and expense, tends to favor large, well-funded companies.

If this trend toward patent protection continues, computer attorneys must address the interaction of patent and copyright protection for computer software. This is not a simple task; these two forms of legal protection guard different rights. Patent law focuses on the invention in a "machine" or "process" while copyright protects a "writing" and focuses on "expression," which can include structural elements (see chart page 66).

Copyright law, with its longer term of protection (a minimum of 50 years), might undermine one of the most basic policies of patent law: a limited term of protection in return for complete disclosure of the invention.

Without legislative or other guidance, courts will resolve these issues on a piecemeal basis. Yet the resolution will be important to decisions about how to commercialize products. A vendor might be reluctant to create a product if he believes it is patented because reverse engineering, which is permitted by copyright law, is forbidden under patent law.

Legal complexity: The growing importance of databases. Revenue for database vendors exceeds $6.5 billion per year, yet the scope of legal protection of databases is unresolved. The courts have employed conflicting theories to justify protection of such compilations: "sweat of the brow" vs. "selection and organization."

The sweat of the brow theory holds that copyright protection should be based solely on the amount of effort that was expended in collecting data. Prior to a recent Supreme Court decision, telephone companies were successful in preventing other parties from copying their white pages based on this theory.

The selection and organization theory provides that collections of data can be protected only if the collections demonstrate some minimal level of selection and organization of individual components of data.

Under this theory, the white pages of a telephone book would not be protectable under copyright law because they consist of all of the individuals in a particular area (no selection) arranged alphabetically (no organization).

The U.S. Supreme Court has adopted the selection and organization theory as the basis of copyright protection for collections of data. Its application to databases will be difficult because database organization can differ markedly, depending on the particular database used.

The use of databases and other on-line services, including electronic mail, also raises new and different challenges in the area of vendor liability. The Supreme Court suggested in a recent case that it would not give information providers the First Amendment defense against liability accorded newspapers and other traditional media.

The increase in the amount of data collected about individuals and the ease of collating and distributing such information has raised significant database privacy concerns.

For example, after 30,000 complaints, Lotus and Equifax, Inc. recently announced the termination of their Lotus Marketplace database of consumers' credit history.

It is still unclear, however, what level of responsibility an on-line service provider has regarding defamation and copyright infringement by its users. No real guideline exists to determine the appropriate allocation of risk among the service providers (such as Dialog Information Services, Inc.) and the information providers (such as the Dow Jones News Service).

Legal complexity: Protecting and exploiting new kinds of works. Some new computer products do not easily fit in the traditional legal categories. One current example is a programmed array logic device. The product incorporates characteristics of both hardware and software. Should it be protected by copyright or patent law? What scope of legal protection should it receive?

The growth of multimedia products also introduces unique challenges. The vendor that tries to assemble the rights to a multimedia work that includes movie clips, still pictures and sound recordings will have to negotiate with many different parties for licenses to use these different elements.

The legal and administrative costs of negotiating this complex network of unique agreements to obtain the necessary rights may inhibit the development of such products for all but the very largest markets. One approach to the reduction of these transaction costs would be the development of a standard agreement for exploiting these rights.

The next decade will see the continued evolution of computer law. Nonetheless, statutes and judicial decisions are certain to lag behind technology. This reality imposes a special burden on computer lawyers and their clients to find creative solutions to these challenges, both contractual and statutory.

These issues are too important and too far-reaching to be left in the hands of the legal community, however. Those most affected — the users — must also have a hand in developing a new body of law to deal with these new realities.

Users can be a part of the process by dealing with problems as they arise in their own use of computer products.

Proactive users will discuss potential legal issues and problems in advance with their legal counsel as well as act through industry organizations such as the Software Publishers Association and the Computer Business Equipment Manufacturers Association. •

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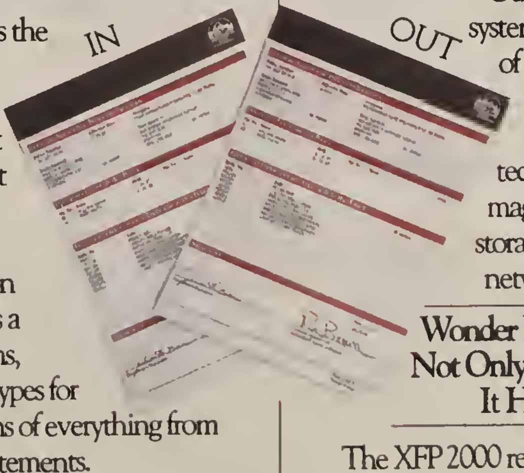

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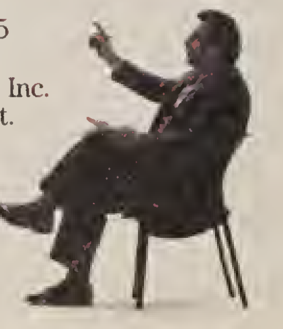

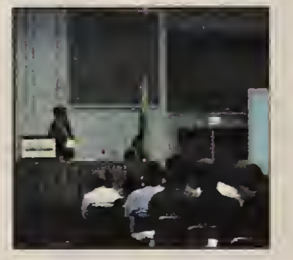

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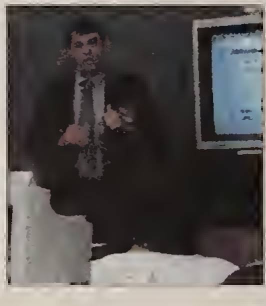

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"Desktop Directions: How New Desktop Technologies Will Further Empower People"

Lotus Technology Briefing
Wednesday, August 14
1:00-2:00 pm

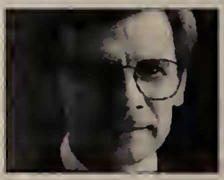
Dr. Frank King
Senior Vice President, Software Business Group
Lotus Development Corp.
"Software Applications for Working Together in the 90s"

OS/2 Strategy Briefing
Thursday, August 15
8:30-10:15 am

Lee Reiswig
Asst. General Manager, Programming, Personal Systems, IBM

Joe Guglielmi
General Manager, Marketing & Business Development, Personal Systems, IBM
"Personal Systems Software Directions"

Developers' Keynote
Friday, August 16
9:00-10:00 am



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NATIONAL BRIEFS

RSVP — and step on it

▶ More than 50% of the 400-plus information systems professionals who were recently surveyed by Delran, N.J.-based technology market research firm **Datapro Information Services Group** named response time performance as one of the three most critical criteria in choosing a service firm. Price and technical expertise emerged as the second- and third-ranking factors. **IBM** and **Digital Equipment Corp.** showed up in the survey as the two most frequently used service providers.

Big score at small sites

▶ **Borland International, Inc.** carried off top honors in personal computer applications software customer satisfaction in a recent nationally syndicated computer study conducted by market research firm **J. D. Power and Associates**. The Scotts Valley, Calif.-based software house led second- and third-place entries **Wordperfect Corp.** and **Claris Corp.** in the study, which was based on a national random sample of 1,784 small and medium-size businesses at sites with fewer than 500 employees. The respondents pointed to software capability, ease of use and support as the factors most likely to yield end-user satisfaction.

Bigwig, littlewig

▶ The founder of router bigwig **Cisco Systems, Inc.** in Menlo Park, Calif., has spun off a "32-bit computer" company called **XKL Systems Corp.** in Redmond, Wash., according to a Cisco spokesman. The source said **Leonard Bosack** will remain with Cisco through the end of the year as a consultant and will continue to sit on the firm's board of directors.

Search for tomorrow

▶ In search of streamlined operations, tightened focus and heightened productivity, Santa, Cruz, California-based Unix vendor The Santa Cruz Operation earlier this month formed the following four product line business units: Distributed Corporate Computing, General Business Systems, Complementary Products and Services. The new Distributed Corporate Computing unit will focus on the recently formed Advanced Computing Environment consortium.

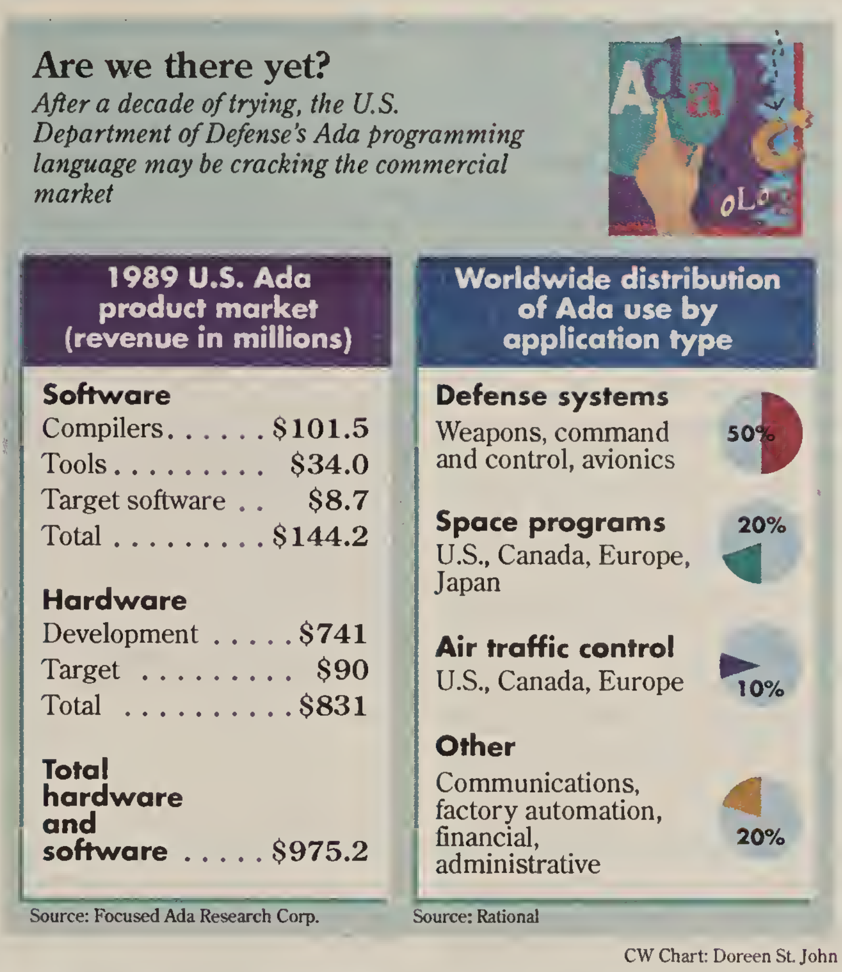
Ada making its mark at commercial sites

BY GARY H. ANTHES
CW STAFF

After 10 years, Ada — conceived by and for the U.S. Department of Defense as the programming language to end all programming languages — is finally catching on at the Pentagon, aided by mandates from the brass and from Congress.

As a result, Ada product vendors, beginning to see some payback on their investments, are increasingly training their sights on the commercial sector. So far, Ada has made tiny inroads in the commercial market; however, it has won enthusiastic support from some sophisticated users, including several winners of the Malcolm Baldrige National Quality Award.

Despite these successes, there is still no consensus as to whether the language will take off like Unix or fizzle like PL/1.



Are we there yet?

After a decade of trying, the U.S. Department of Defense's Ada programming language may be cracking the commercial market

1989 U.S. Ada product market (revenue in millions)

Software	
Compilers	$101.5
Tools	$34.0
Target software	$8.7
Total	$144.2
Hardware	
Development	$741
Target	$90
Total	$831
Total hardware and software	$975.2

Source: Focused Ada Research Corp.

Worldwide distribution of Ada use by application type

Defense systems Weapons, command and control, avionics	50%
Space programs U.S., Canada, Europe, Japan	20%
Air traffic control U.S., Canada, Europe	10%
Other Communications, factory automation, financial, administrative	20%

Source: Rational

CW Chart: Doreen St. John

Too many options

Encumbered and confused by the more than 400 programming languages and dialects its employees and contractors were using, the Defense Department adopted Ada as a standard in 1983. During the ensuing years, it mandated Ada use in an expanding array of applications.

The rich and powerful language was designed to complement modern software engineering practices, thereby leading to increased programming productivity and more error-free and reusable code.

However, reaction in the trenches was underwhelming, ranging from fierce resistance to simple noncompliance. Waivers of the Ada mandates were routinely granted whenever software developers claimed Cobol, Fortran or something else would be more cost-effective.

In the last two years, however, the tide has turned as Ada's shortcomings have been overcome — at least in part. Waivers are now rare and may become nearly nonexistent; on June 1, a federal law became effective ordering the use of Ada at the Defense Department.

In 1989, according to Focused Ada Research Corp. in Falls Church, Va., users spent $144 million on Ada software products, bought or used $831 million in hardware for Ada development and paid an additional $1 billion in direct salaries to Ada programmers.

Meanwhile, the value of Ada-based systems development projects, most of them for the Defense Department, ran into the tens of billions of dollars. At that time, there were 25,000 programmers and engineers using Ada to develop software, the company said.

Focused Ada Research and the major Ada product vendors predict a 20% growth rate for the Ada market over the next few years. However, they say growth could be much higher if the language catches the fancy of the nondefense world.

Increasing approval

Much of the criticism that greeted the introduction of Ada has faded as compilers and tools have improved. Users no longer pay huge performance penalties for using Ada, according to many industry observers, nor must they scrape by with primitive development environments.

Moreover, while critics say these deficiencies have blocked the soaring popularity predicted by Ada's early advocates, the language's defenders point out that it took more than 15 years for Cobol, another Pentagon-sponsored language, to really catch on.

It is the attendant software engineering disciplines required in order to use Ada, more than the language itself, that result in low error rates and a high percentage of reusable code. One major obstacle to Ada's penetration of the commercial world, according to vendors, is user resistance to adopting these disciplines and, in some cases, failure to see the need for them.

Rational, a $30 million vendor of Ada products in Santa Clara,

Continued on page 70

Motorola exec decries government regulations

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — "I'm going to be radical here today," Robert W. Galvin, chairman of the executive committee at Motorola, Inc., recently told a luncheon audience at the Armed Forces Communications and Electronics Association convention. He was not exaggerating.

The downfall of communism and of Saddam Hussein notwithstanding, Galvin said the U.S. must maintain a very strong defense in the face of severe budget cuts. He suggested that the daunting task could be achieved by streamlining — in fact, largely eliminating — the government/vendor interface.

Galvin turned *radical at AFCEA convention*

Galvin pooh-poohed a long succession of blue-ribbon panels that have studied the process by which the government procures computer and communications systems, only to propose incremental improvements that never go anywhere. "Take a clean sheet and forget everything going on in Washington," he said.

Congress, Galvin said, should adopt a policy of zero micromanagement: no hearings, no audits and almost no regulations. "Give the budget to [the Department of Defense] and let it do its mission. That will eliminate all sorts of mischief and inefficiency."

Motorola was a Malcolm Baldrige National Quality Award winner, a feat Galvin said was made possible by efforts to improve product quality and reduce production delivery cycle times.

He said the factors that improve quality also tend to shorten cycle times. By streamlining the procurement and postprocurement development cycles, quality can be improved and costs cut, Galvin suggested.

He said there is so much waste, redundancy and friction in government/industry relations that a wholesale streamlining of these processes could improve quality as much as 100%, reducing costs to the government by 50%.

Galvin acknowledged that Congress is not ready to count itself out just yet. "People will laugh, and it won't happen this year," he said, "but say it again next year, and maybe people won't laugh so hard."

Galvin said the typical company pays a 20% to 30% cost penalty for poor quality in its operations. He said would-be Baldrige Award winners should hold their suppliers' feet to the quality fire. "You should say to your suppliers, 'If you don't go for Baldrige also, we won't buy from you.' "

Galvin said Motorola could never have won the Baldrige award without that kind of approach to its suppliers.

NATIONAL BRIEFS

Lives of their own

▶ The winding down of the **AT&T/Sun Microsystems, Inc.** alliance will do nothing to dampen the fervor of either the **Open Software Foundation (OSF)** — the consortium founded to safeguard the market from being unfairly wrenched toward AT&T's Unix System V — or **Unix International, Inc.**, which sprang up to bolster Unix System V against the competitive efforts of the OSF, according to industry observers. Both organizations, analysts said, have grown well beyond their original raisons d'etre. Late last month, the analysts appeared on target as Unix International opened for business in **Singapore**. The Unix group chose Singapore as the site from which to launch its expansion throughout the Pacific Basin not only for its strategic location but also for its strong telecommunications facilities, according to Unix International Chief Executive Officer Peter Cunningham.

Royal welcome

▶ Here is one more advantage of the global marketplace: Without it, a San Diego-based business software products purveyor to the personal computer market — **Software Products International**, for example — would not be likely to be honored by the **King of Spain.** Just ask Software Products President John Bowne, who traveled to Madrid last month to attend a ceremony at the Palace of the Zarzuela, at which His Royal Highness Juan Carlos de Borbon y Borbon recognized the software company for the instrumental role it played in the computerization of his country's businesses.

Software industry bucks trend

BY NELL MARGOLIS
CW STAFF

Recession notwithstanding, the U.S. software industry is going full steam ahead — and is looking to increased productivity fueled by flexible work terms to maintain its upward trend in the future, according to two reports issued late last month.

Some 500 chief executive officers from a cross section of the nation's software firms responded to the Software Industry Business Practices Survey conducted by consulting and accounting firm Price Waterhouse for the Massachusetts Computer Software Council, Inc. The respondents indicated expected 1991 software sector employment growth around 15%.

The anticipated expansion, according to the survey's findings, will be driven by mounting pressure on software companies to support "multiple everything."

Meanwhile, a second survey commissioned by the Massachusetts Software Council — its fourth Annual Survey of Compensation, conducted by the accounting and consulting firm of Coopers & Lybrand — shed some light on how the companies plan to fund their optimistic growth estimates.

"Employee productivity and competitiveness of pay are projected to be top issues in attracting a qualified work force in the 1990s," said Coopers & Lybrand compensation consulting director Davis T. Gallison III. Mounting popularity of annual bonus programs and long-term incentive plans, he said, reflect this concern.

Please sir, may I have some more?

Although the slowing economy in 1990-1991 caused salary freezes at some 16% of the 258 software firms surveyed, the average annual pay for top software jobs increased across the board

Area	Chief executive officer	Director of marketing	Director of sales	Chief scientist
Massachusetts	13%	9%	12%	9%
Mid-Atlantic	7%	11%	5%	11%
Midwest	8%	10%	4%	8%
South	13%	8%	5%	3%
West Coast	11%	4%	5%	5%

Source: Coopers & Lybrand

CW Chart: Doreen St. John

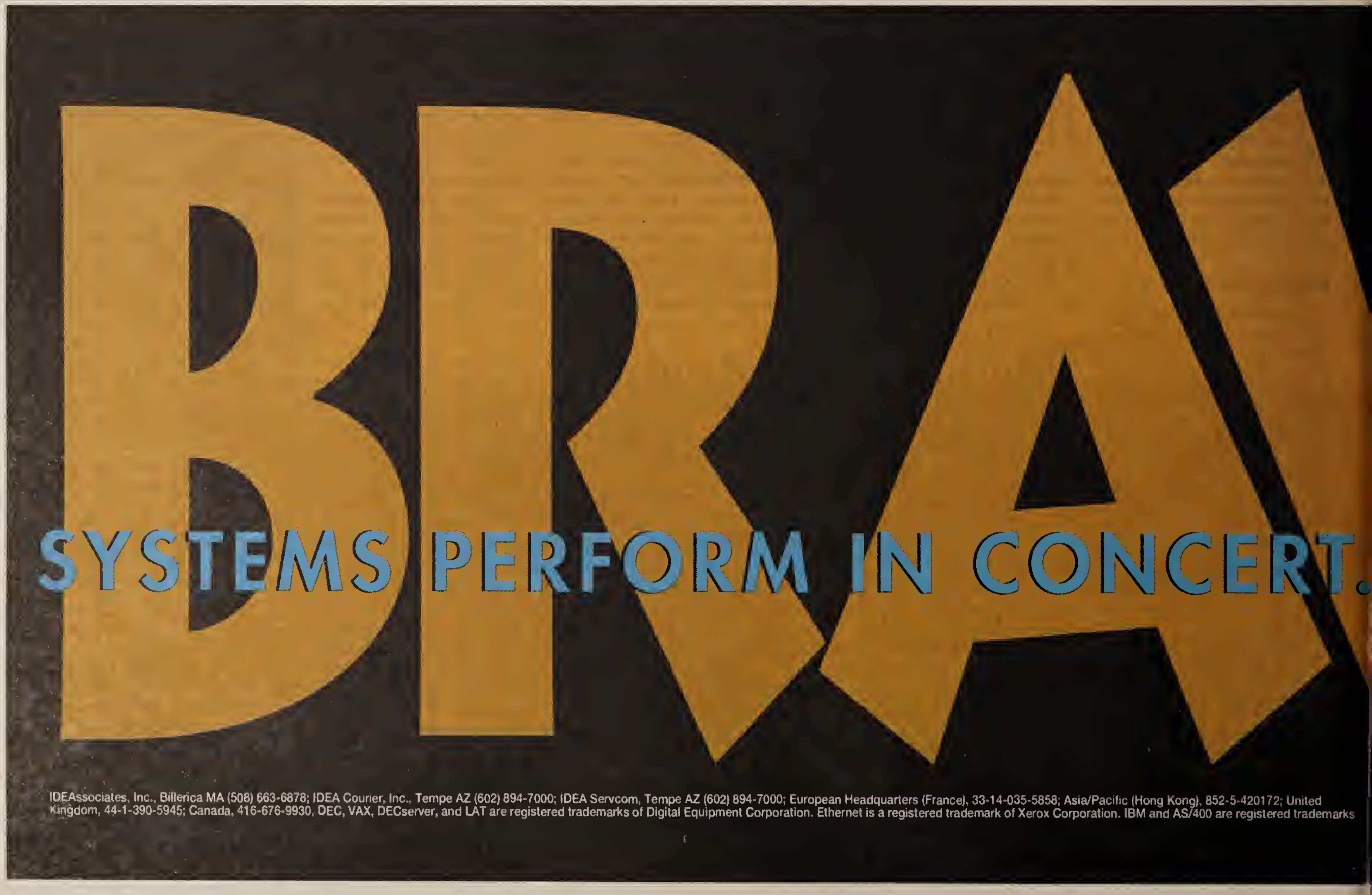
Ada

FROM PAGE 69

Calif., got into business in 1981 to "productize" software engineering techniques, according to Executive Vice President Bob Bond. The firm's decision to base its products on Ada was a secondary and less important one, Bond said. "We like Ada — we've had a lot of success with it — but Ada is not our business."

Rational sells Ada compilers, development tools and hardware geared for developing large Ada systems. Last year, IBM bought a significant equity stake in the company and is now using Rational tools in the $3.6 billion overhaul of the U.S. Air Traffic Control System. The Federal Aviation Administration's (FAA) Advanced Automation System will be a showcase for Ada one way or the other: The FAA says its 2 million lines of Ada code must not fail more than three seconds per year.

Until recently, Bond said, no good alternative to Ada existed. Now, AT&T's C++, another object-oriented language, rivals Ada for the affections of software engineers. Although Ada has the advantage of being more mature and more standardized, development shops with a lot of



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C and Unix experience may prefer C++ for smaller projects, Bond said. Nevertheless, he added, "Ada is best for large-scale development."

Digital Equipment Corp. has invested more in Ada during the past 10 years than in any other language and has more than 10,000 Ada users worldwide, said Ada product manager Pat Bernard. Defense contractors such as General Electric Co. and Westinghouse Electric Corp. are beginning to leverage their Ada tools and know-how into nondefense lines of business, she said.

However, Ada penetration of the U.S. commercial sector will be slow, with faster growth occurring in Europe, Canada and the Far East, Bernard added.

What auditors see

The traditional short-term financial orientation of U.S. firms works against the adoption of Ada and its attendant software engineering disciplines. Getting into Ada may cost hundreds of thousands of dollars in software and more in training, according to industry analysts. The savings in reusable code and reduced software maintenance may be huge, but they might not show up for years.

"Software contractors have no financial incentive to develop reusable code," said Ralph Crafts, Ada Software Alliance president. They would need to spend from 15% to 25% more time designing in order to maximize reuse, a penalty that could knock millions of dollars from the bottom line of large projects.

In addition, standard accounting principles, in most cases, do not allow carrying the value of the resulting software on the company balance sheet, Crafts said.

Crafts urged firms to argue with their auditors to allow the capitalization and depreciation of reusable software. A change in the way accountants view investments in software would encourage the use of Ada and other languages geared for the development of low-maintenance, reusable software, he said.

GARY H. ANTHES

Ada is especially well-suited to real-time, embedded applications — and not just those in weapons systems, said Steven Deller, business development vice president at Chantilly, Va.-based Verdix Corp., which sold $13.5 million worth of Ada products last year. Automobiles will someday roll off of assembly lines with one million lines of software code under their hoods — a natural application for Ada, he added.

A new version of Ada, called 9X, is being defined to include functions specifically for business, Deller said. For example, Ada 9X will be able to accept the binary-coded decimal data format common in many financial applications and will be able to support the 64-bit fixed-point arithmetic needed to represent large dollars and cents figures.

Moreover, Ada may be advancing further into the commercial sector than it appears. Ralph Crafts, president of the Ada Software Alliance, said commercial use of Ada is hard to measure because users often guard their success stories as closely as trade secrets. For instance, he said, four Fortune 500 firms slated to speak at a 1988 trade show canceled when top management chose to keep their Ada experiences under wraps.

Where is Ada?

- The Radio/Telephone Systems Group of Motorola, Inc., a Malcolm Baldrige National Quality Award winner, used Ada to develop a tool for testing mobile telephone systems. No member of the project team had any experience with either Ada or object-oriented design; nevertheless, Motorola reported greater productivity, lower error rates and more reusable code than it realized from a comparable C project.

- Later this year, Reuters Information Services, Inc. is scheduled to deliver two Ada systems that will support real-time global futures and options trading and currency exchange for the Chicago Mercantile Exchange. Based on positive results in using Ada for a prototype, a Reuters spokesman said, management decided to go with Ada over incumbent language Pascal for use in the full systems, each of which will have some 250,000 lines of code.

- Genesis Software, Inc. in Kansas City, Mo., developed Prompt Paymaster — a contracts administration, accounts payable and payments package — in 250,000 lines of Ada. A Genesis spokesman estimated that it would have taken 2.5 million lines of code and cost 10 times as much to develop the system in Cobol. The company devotes less than one full-time employee's working hours to maintenance; a Cobol version of the product, the spokesman said, would require Genesis to put five to six people on the job.

- Xerox Business Products and Systems, another Baldrige Award winner, has chosen Ada for control software for copiers. It evaluated a C/C++ combination and two internal Xerox languages as well as Ada and found Ada best in quality of language, quality of tools and return on the investment required to move to the new language.

GARY H. ANTHES

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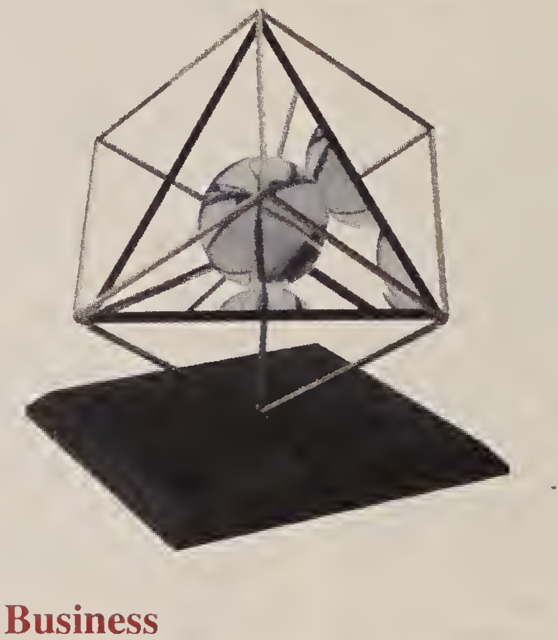
Heroic Achievem

The Computerworld Smithsonia

The Computerworld Smithsonian Awards program searches out and publicly honors men and women who are applying information technology to make our planet a more humane, healthy and cooperative place to live. On June 10, 1991, these heroes were celebrated at the National Building Museum in Washington, D.C.



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Education & Academia

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Government & Non-profit Organizations

De Anza College

Bay Area Coalition for Employment of Persons with Disabilities computerized its job placement process via a customized bulletin board system. BAC-NET is used to share employment opportunities with the more than 2,000 job seekers with disabilities.

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*Maricopa County Public Defender's Office
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Ill. Dept. of Revenue
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Social Security Admin.
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Bu. of Naval Personnel
NYNEX Info. Resources
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TX Dept. of Human Services
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Science

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Gail Morse, a Christa McAuliffe Science Educator, has pioneered a technology-intensive classroom to help students at risk of dropping out of school. Students are divided into interdisciplinary, cooperative learning groups for math, language, arts, science, and social studies. In her classroom student use computers, laser video-disks, microcomputer-based laboratories, satellite communications, and video.

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This award recognizes an individual who, over a lifetime and in the face of considerable obstacles, has made an outstanding contribution to society through the use of information technology.

Mr. Robert Noyce

Bob Noyce was a pioneer in the development of the integrated circuit. His innovations include erasable read-only memory, microprocessors, and dynamic random-access memory. His commitment to excellence reached beyond the boundaries of his immediate business responsibilities. He lobbied vigorously in both technical and political arenas to ensure the leadership of the United States in the area of electronic innovation.

MCI Communications Information Technology Leadership Award

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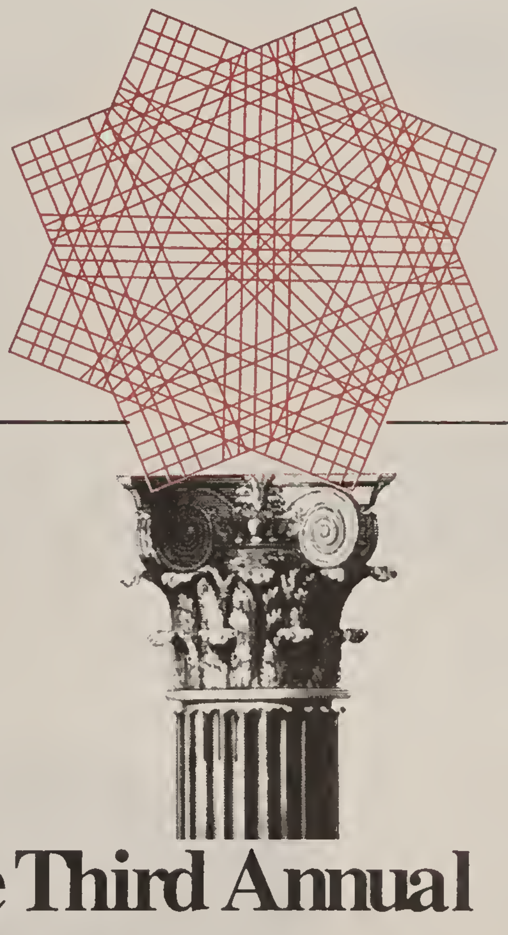
Mr. Erich Bloch

Erich Bloch was a leader in the development of modern computers. During the early 1960s he helped develop the IBM/360, the first compatible "family" of computers and a revolutionary development in the computer industry. From 1984 through 1990 Mr. Bloch was director of the National Science Foundation, a leading source of federal support for science and technology research. His strong leadership guided national programs in the sciences and engineering.



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Nokia acquisition is just the first step for ICL

Company denies a rumored merger with Olivetti but affirms its commitment to Europe

BY RON CONDON
IDG NEWS SERVICE

LONDON — International Computers Ltd. (ICL) has signaled that last month's purchase of Nokia Data Systems [CW, June 10] will not be its last in Europe.

The Fujitsu Ltd.-owned company denied rumors that a merger with Italy's Ing. C. Olivetti & Co. would be the next step. An ICL spokesman said the idea was "wildly grandiose." However, "For the last four years, we have been saying we wish to grow in Europe by mergers, acquisitions and collaborations and will continue that policy," he added.

Olivetti is reported as saying it would fight any deal with ICL. The two companies have had merger talks in the past, but Olivetti Chairman Carlo De Benedetti has said he would fight bids from Japanese companies, as ICL is now 80% owned by Tokyo-based Fujitsu.

However, a spokesman for Olivetti was slightly ambiguous, saying, "De Benedetti has said that any type of arrangement in which a Japanese company assumes majority control is out of the question. But defining what is a Japanese company is becoming increasingly difficult."

Joint actions

ICL's relationship with Fujitsu is also getting closer, despite both firms' claims to an arm's length arrangement. The two firms recently made a joint bid for a British university contract, and now ICL Australia is bidding Fujitsu's MVS-compatible mainframes with Woolworth Australia.

"We bid in conjunction with many companies. We are a systems integrator and will supply whatever hardware the customer requires," the ICL spokesman said.

The $391 million purchase of Nokia Data is expected to be finalized in three months, resulting in a company that employs some 24,000 people and has joint revenue of about $4 billion — making it the fourth-largest computer firm in Europe. It will be known as ICL Nokia Data in Scandinavia and as ICL elsewhere.

With Nokia Data's manufacturing plant in Finland, ICL's annual personal computer output alone is now set to increase to approximately 250,000 units. However, more significantly, the acquisition will give ICL access to Nokia Data's expertise in PC local-area networks and workstations, while also strengthening ICL's open systems product portfolio.

Nokia Data's key vertical markets in Scandinavia and Europe include the retail, financial and local government sectors, providing systems to interface with IBM, Digital Equipment Corp., Unisys Corp., Siemens Nixdorf Informationssystemes AG and Groupe Bull hosts, among others.

Speaking at a conference in London recently, ICL Chairman Peter Bonfield insisted that funding for the takeover had come entirely from within ICL. Although Fujitsu was aware of the transaction, it had no financial involvement, he said.

Melding the companies

Speaking at the same conference, Nokia Data President Kalle Isokallio revealed that the ICL deal could lead to more collaboration in other fields of electronics between Nokia Data and Fujitsu.

Meanwhile, a question mark hangs over how Nokia Data's work force, manufacturing facilities and product range will be integrated with ICL's own. ICL currently relies substantially on Taiwanese computer manufacturer Acer Technologies, Inc. for the supply of its PCs. But with Nokia Data's plant in Finland now available, there is a strong possibility that some of this production could be switched to that site.

Bonfield also acknowledged there would probably be "some rationalization" of the two companies' products, although it was too early to be specific.

He maintained that expanding ICL's range of software and services across Europe was one of the main reasons for acquiring Nokia Data, especially as its product portfolio was, to a large extent, complementary to ICL's.

Quizzed on whether any jobs were threatened as a result of Nokia Data's 7,000 employees now being added to his company's payroll, Bonfield pointed out that despite the pressure on profit margins, his company was still expanding. He claimed the attrition rate for a company of ICL's size would normally account for the shedding of some 3,000 jobs per year.

On the question of whether he anticipated any objections to the Nokia Data takeover from within the European Economic Community, Bonfield was similarly phlegmatic. "I can't see why anyone should object, apart from our rivals," he said. "The deal not only increases our research and manufacturing capability across Europe, but it also means we now have a [$1.7 billion] operation on the continent. That's good for our customers, good for our employees and good for competition in general — and I think that's what we're supposed to be doing."

Condon is a London correspondent for the IDG News Service.

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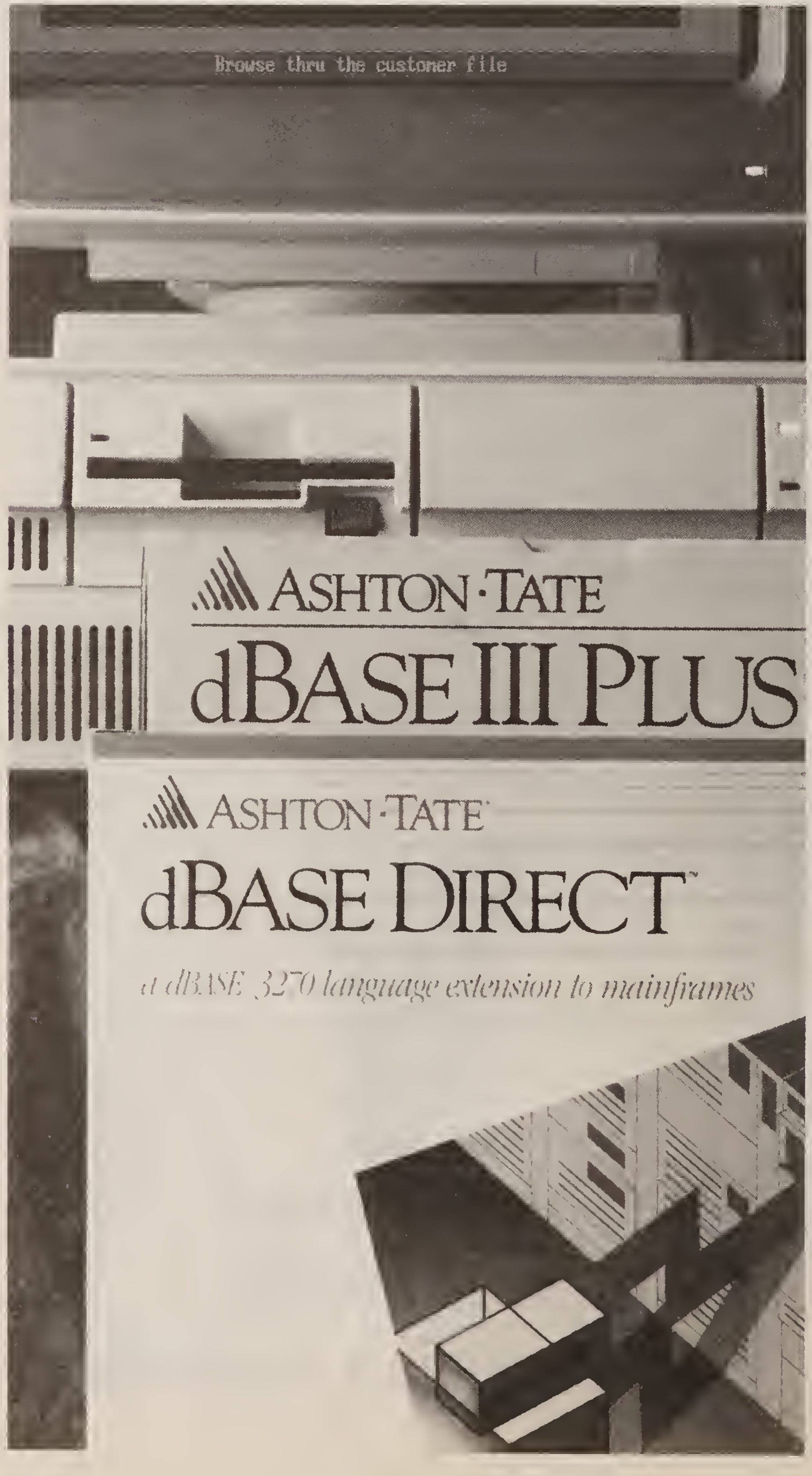
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COMPUTER CAREERS

Job rotations grease long-term IS wheels

BY ALAN J. RYAN
CW STAFF

Evan Wride became a believer in job rotation when he was moved from the information systems department at restaurant chain Denny's, Inc. into the company's assistant controller position.

While formal college degrees and technical prowess are on Wride's list of career development must-dos, "If I have to single out one thing, I can't think of anything more beneficial" than job rotation, he says. "It exposes you to new technologies, new applications, new business areas and new people."

Since his days at Denny's, Wride has moved on to become director of IS at Nissan Motor Corp. in Carson, Calif. He says job rotation makes for well-rounded employees with better cross-departmental communication skills.

Job rotation "cuts across every area of development a person needs to get," Wride says, "and there is direct correlation between how broad you are to how high you can go."

For employees, there are several advantages to rotating jobs and responsibilities:

- The employee learns new skills, including people skills.
- IS workers have the opportunity to expand technical proficiency by working on different types of hardware and software.
- Rotated employees have more interaction with a greater number of people.

Useful rotations

Professionals who plan to make their career in IS and who see job rotation as a useful way to gain business experience will find that some rotations make more sense than others. Experts agree that the most useful rotations are in the functional areas that most closely relate to the IS professional's current role.

For instance, a programmer who writes financial applications will usually find that a job in the finance department will be easier to adapt to than one in marketing. Once the rotation is completed, he can go back to IS with a new appreciation of the user perspective.

Fortune 500 companies are the most likely to offer this type of career development plan, job placement specialists say. The benefits for employees are greater at these large firms, where without such programs, IS workers can sometimes become compartmentalized into one area.

However, for managers, moving a company into job rotation mode is not without its challenges, says Rob Graven, owner and president of PFC, Inc., an executive search firm in San Francisco. But, he adds, the long-term benefits outweigh the initial problems.

"Any kind of transition costs time and money," Graven says. By taking a business analyst from one area and moving him to another, the company will have two workers in transition: the worker learning a new area and the worker filling the business analyst's post. Both may take up to six months to get up to speed in their new jobs.

Nissan is still in the early stages of the job rotation process, Wride says. It is a companywide program, but he can take credit for starting the process in the IS area.

Wride agrees that the initial investment period into a job rotation process shows few quantifiable paybacks. "The company might not get payback for four to six years," Wride says. But as each year passes, the company will have a greater percentage of employees who have a broader understanding of all aspects of how Nissan works, he adds.

Another issue to grapple with when starting any type of new program is fear of the unknown, Wride says. "If you're moving into a job you've never done before, you probably ought to be a little apprehensive," he says. "But after six or 12 months, you figure out that you can pretty much do any job" if you've got good business sense.

Some companies, such as Xerox Corp., offer formalized rotation processes for entry-level employees, whereby workers selected for the program will rotate through various jobs every three to six months, explains Carol Jones, manager of human resources strategy for corporate information management at Xerox's Rochester, N.Y., office.

The quick rotations give the IS workers a window on the company as a whole and on the kinds of departments they will be supporting, she says. The program has been in place since 1989, but results have yet to be measured, she says. "That can't really be assessed until those people move further along in their careers."

At other firms, the rotations may last two years or longer: Many firms say that the first three to six months in a new job is the "breaking-in" period and that a worker should remain in the job for at least 18 months to contribute to that business.

Moving in, moving out

For many companies, the most common types of job rotations are interdepartmental. IS workers may rotate through several IS positions, acquiring new skills as they go. Less frequent are instances where employees from the IS department are rotated to jobs outside of that department. And even less frequent are rotations that involve bringing nonsystems workers into the IS department.

However, if Levi Strauss & Co. is an example, the norm may be changing. At the San Francisco-based apparel manufacturer, the shift toward IS workers gaining more business skills and business workers gaining more analytical skills means that the cross-departmental flow of workers is likely to increase.

To date, there have been more employees rotated from business areas into IS than vice versa, says Donna Rund, director of information engineering. One way to make that happen, she says, is by first giving people a "dotted-line" responsibility to IS for their respective business areas.

In the last two years, she says, two director-level business managers have moved into the IS environment. One, a former merchandising manager, is now director of end-user support. "They bring a balance and perspective that if you just had pure technical, you don't quite get."

That is not to say IS people do not have a chance to move as well, Rund adds, citing an IS business analyst who moved to merchandising and is now one of the highest officials in that area.

Ryan is a *Computerworld* senior writer, features.

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Demand for Unix C programmers soars

BY ALICE LAPLANTE
SPECIAL TO CW

Programmers who can write applications for Unix in the C language are getting the red carpet treatment. A strong demand for these professionals has been created for two reasons: Unix is becoming more popular in the commercial sector, and C is overwhelmingly the language of choice on Unix because of its portability across a wide variety of platforms.

Four years ago, Unix was confined mainly to scientific and engineering shops. But the increasing acceptance of IBM's AIX and Sun Microsystems, Inc.'s Sparcstations — coupled with the downsizing of mainframe-based applications onto minicomputers and local-area networks — has accelerated interest in Unix in the commercial sector.

Brokerage firms, manufacturing facilities and even banks are moving to take advantage of both the portability and cost savings inherent in a Unix-based, smaller systems environment.

"Unix is becoming a ubiquitous platform, displacing traditional IBM mainframe environments in a number of key industries," says Richard Wonder, national director of the information systems division at recruitment firm Robert Half International, Inc.

Because of this shift, Wonder says, there's a short supply of C programmers who can build corporate applications and communications systems.

"Good C programmers are hard to find," says Joe Hawkins, technical director of the advanced systems group at Pacific Bell in San Ramon, Calif. He is currently looking to hire C experts for internal expert systems development.

Improved education

Other IS managers say the shortage of Unix C programmers is beginning to ease — thanks in large part to the fact that IS and computer science departments at universities now teach C as a regular part of the curriculum. "Schools began incorporating C a few years back, so we are now seeing relatively young people with a good grasp of the language," says Frank Panella, director of systems development at Dow Jones & Co. in Princeton, N.J.

The benefits of C in the Unix environment are many. C can be a very productive language in a business environment because of its portability, Panella says. He can leverage those IS workers who know C across a number of different hardware platforms. For this reason, Dow Jones — which currently does not use C on its IBM systems — has initiated a program in which IBM software developers are being introduced to C in classes and seminars, with an eye toward making them more versatile. "This will enhance productivity as well as ultimately make programmers more upwardly mobile," Panella says.

In addition, companies with heavy number-crunching or statistical processing needs have taken to Unix and C wholeheartedly. That's why brokerage house LBI Trading, Inc. in New York is currently developing C-based applications on Sun Sparcstations, says Jo Bette McCann, vice president of systems development.

Even in regions hurt by the sluggish economy, experienced C programmers can have their pick of jobs at a time when workers with other technical skills are being laid off.

"We haven't experienced a slowdown in demand for Unix C programmers at all, even though openings for IBM mainframe programmers have dropped off considerably," says Bob Rich, associate director of the southwest region of Source EDP, who sees a lot of local firms building departmental applications around Unix minicomputers, particularly in the financial services industry.

Increasing salaries

Because of the overall demand, Unix C programmers are commanding higher salaries. "Unix C programmers can get between $5,000 and $10,000 more than programmers in the IBM world," says Dave Flansbaum, managing director for the Northern California office of Source EDP.

However, while the response to C in the Unix environment is overwhelmingly favorable, some IS managers shun it, saying the much-publicized trend toward C in mainstream IS shops is overstated.

"It's a difficult language, and there are too many ways to get yourself in trouble with C," says Dale Heller, assistant vice president of IBM systems and programming at Service Merchandise Corp. in Nashville. Heller compares the current rage about C with the excitement about PL1 a few years ago.

"It supposedly was building up a tremendous momentum, but a year or two later, people woke up and it never really caught on," he says.

LaPlante is a free-lance writer based in Palo Alto, Calif.

Opportunities knock for DOS, too

The enormous popularity of Microsift Corp.'s Windows has boosted C to become the language of choice in the DOS world.

But IS shops building Windows applications do not hire Unix C programmers — they look specifically for people who have C expertise within the DOS operating system.

"Knowing C in general does not in itself make you marketable," says Richard Wonder at Robert Half International. "It's knowing the language within the context of a certain operating environment — either Unix or Windows — that matters."

Because of key differences between the two environments, there is virtually no overlap in personnel between Unix C and Windows C programmers, IS managers and recruiters say. "Although the language is the same, there's a strong dichotomy in overall skills," says Wonder, who is recruiting Windows programmers for corporations that have recently established Windows as their desktop standard and have a host of internally developed DOS applications to bring up to date.

The reason for the high demand is that "the learning curve for a good C programmer in the Windows environment is from six to nine months, and Windows has only been out a little over a year. That makes it tough for companies to find people with expertise," says Chris Porch, head of Ocean Consulting in Escondido, Calif., which specializes in writing custom Windows applications for large corporate customers.

Still, recruiters say Windows C programmers don't command as high salaries as do Unix C programmers.

"We're still seeing more demand for Unix programmers than DOS C programmers, and companies seem willing to pay more for the Unix expertise," says Dave Flansbaum, managing director for the Northern California region of Source EDP.

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GE Consulting Services, a subsidiary of the General Electric Company, is a leading provider of software solutions for complex information systems problems. Specializing in technology migration, new applications, software and user support, the company's 22 offices and 1500 employees service large Fortune 500 companies, as well as support internal G.E. activities. With such diversity, explains Rick Bawsel, Staffing Manager for the Atlanta Region and Recruiting Coordinator for the Southeastern Region, their hiring typically encompasses two or three technical arenas, never just one.

"Our business tends to focus on certain niches - on-line relational databases, CASE tools, and, with our newly launched PC Solution Centers, advanced PC development projects such as Microsoft Windows, graphics, and object-oriented technology. When it comes to recruitment advertising, we need a vehicle that reaches qualified professionals with very specific backgrounds in the CASE, database, and Unix arenas. To recruit high-level professionals with these specialized skill sets, *Computerworld* is our most viable advertising vehicle. With its industry-wide focus, I know people in Unix shops will see our advertisement as readily as people in IBM shops.

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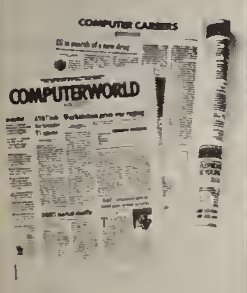

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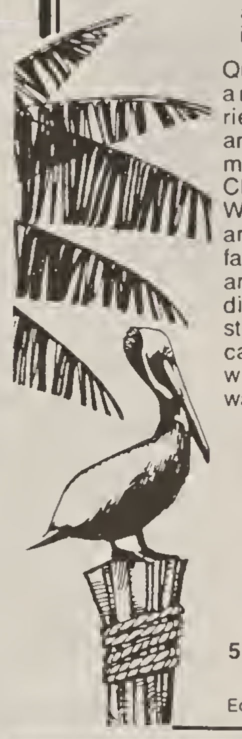

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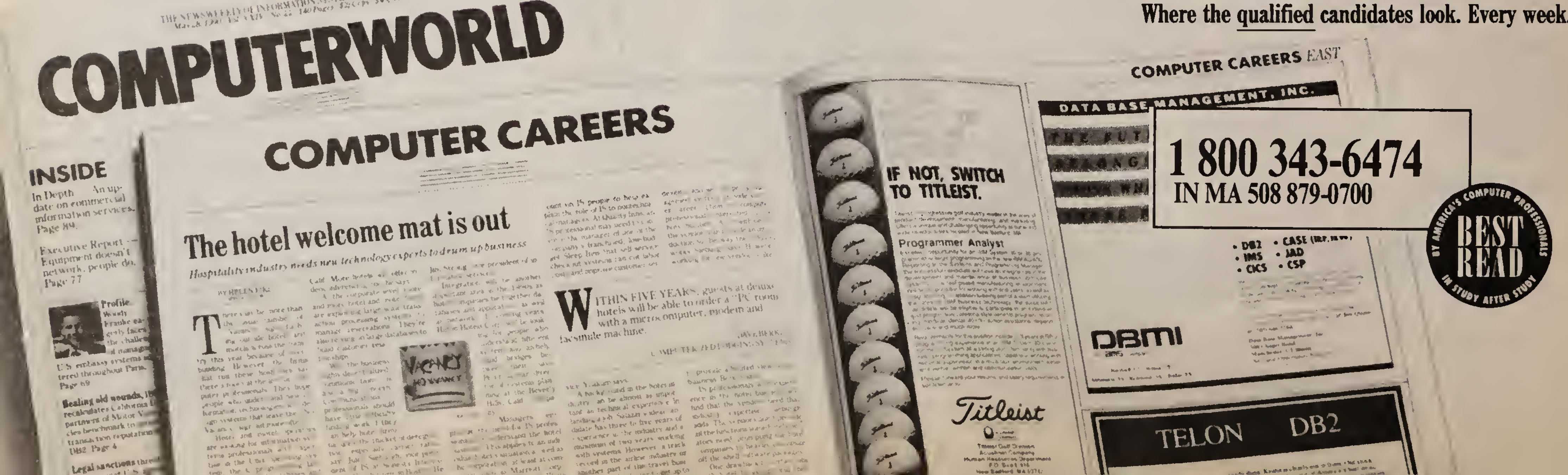
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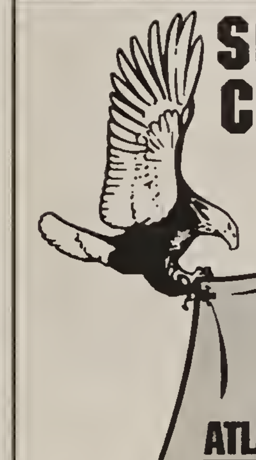

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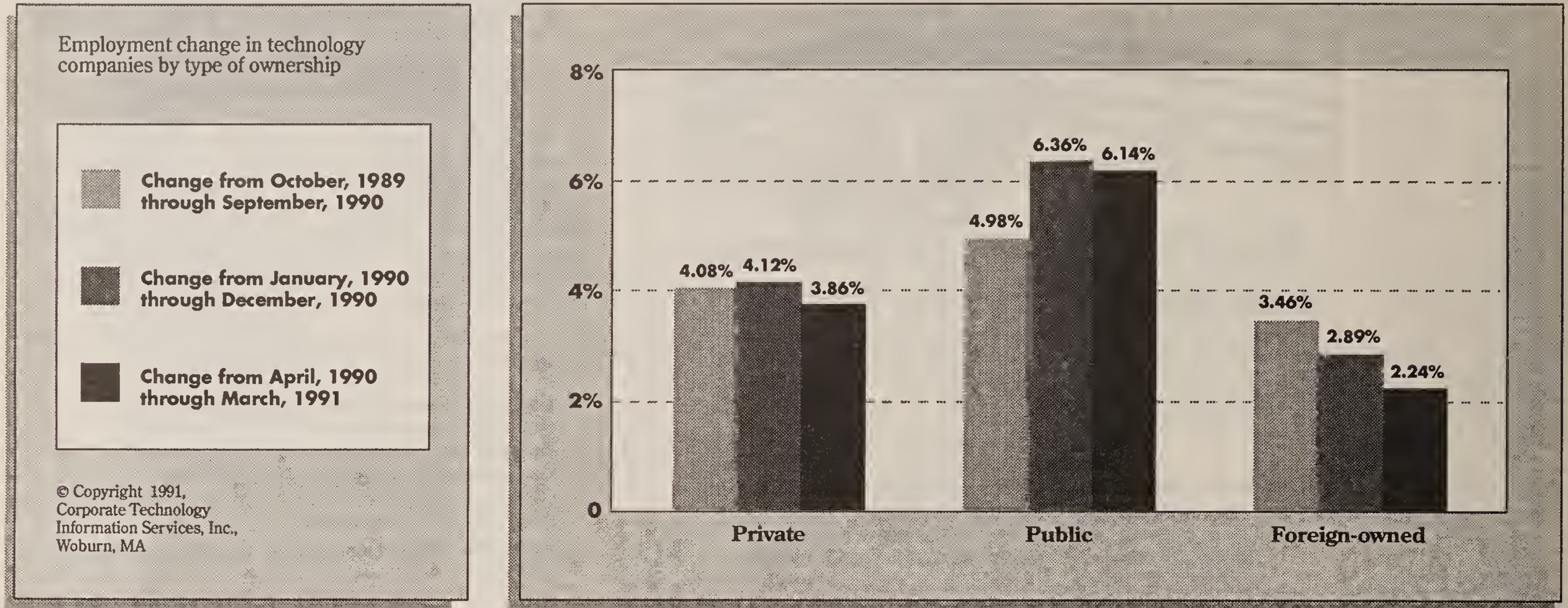

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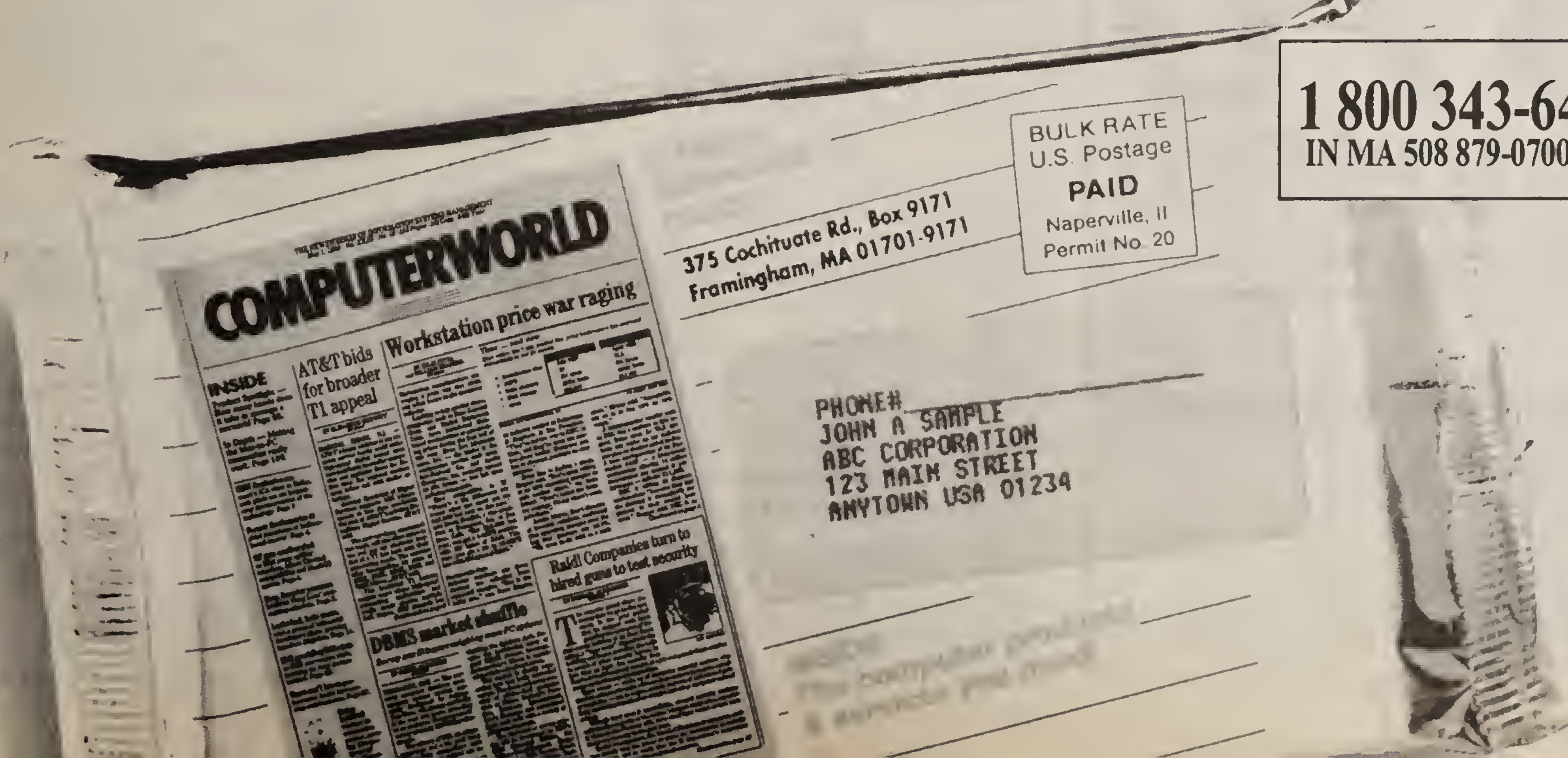
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Avoiding electronic mail legal hassles

Legal eye is a monthly column exploring legal issues and their impact on information systems.

BY BENJAMIN WRIGHT
SPECIAL TO CW

In the past, if a customer wanted to lease equipment from Texaco, Inc., the negotiation process was awkward. Texaco would mail its lease form to the customer, who would cross out some clauses, add new ones and mail the lease back. This process could continue for weeks.

Now, Texaco has a shortcut. It has developed a Lease/Purchase Information Trading System to permit leases to be negotiated electronically. Texaco and its customer sign a trading agreement that sets the general rules for negotiation. Thereafter, as specific lease contracts are needed, Texaco and its customer negotiate and finalize them via electronic mail messages.

Through the advent of computer messaging technology, many business transactions are being handled in this paperless fashion. But skeptics fear that electronic contracts are not legally effective. Information systems professionals may find legal issues to be unexpected roadblocks to the implementation of electronic trading systems. However, the truth is that the legal issues are more manageable than the skeptics think.

A contract comes into being whenever an offer meets an acceptance. Many companies today form contracts through electronic data interchange (EDI), a popular form of computer-to-computer messaging.

An IS buyer, for instance, might send a vendor an EDI purchase order offering to buy 10,000 floppy disks for $3,000. At this point, no contract exists. But if the vendor responds with an EDI purchase order acknowledgment accepting the offer, a contract is born. Buyer and seller become legally bound to the terms of their E-mail messages.

Legal skeptics raise three fears about electronic contracts that IS professionals should take note of: writing requirements, signatures and evidence.

- **Writing requirements.** The "statute of frauds" (a law in almost all states) requires that many types of contracts be evidenced by a "writing" to be enforceable. Traditionally, a writing means ink on paper, so there is some question whether a computer message is considered a writing. No court has specifically ruled on the issue.

Nonetheless, the statute of frauds is an outdated law that now has so many exceptions it has virtually no effect. Moreover, a convincing argument can be made that a recorded E-mail message is a writing. Like a paper document, such a message is an intelligent arrangement of symbolic data, memorialized in a medium that is more reliable than human memory.

Still, to preclude any disagreement on the issue, companies can easily enter special contracts in advance of trading to stipulate that their electronic messages are written.

- **Signatures.** The statute of frauds also denies legal recognition to some contracts that lack a signature.

However, the law defines a signature very liberally. The Uniform Commercial Code, for example, defines a signature as "any symbol" adopted by someone intending to approve a writing.

Thus, a simple string of electronic characters ("ABCD") could constitute a signature if that is the sender's intent. To eliminate any question about signature legality, parties can enter a trading partner agreement that acknowledges specified electronic codes as effective signatures.

- **Evidence.** Skeptics are afraid that computer messages cannot readily be admitted as evidence in court. But the fear was discredited in March 1990, when E-mail messages were admitted into a high-stakes criminal trial — the Iran/Contra prosecution of former National Security Adviser John Poindexter. The case demonstrated that messages need not reside on paper to be admissible into evidence.

In a formal sense, judges refer to certain esoteric principles of law — such as the hearsay rule and the best evidence rule — to determine whether a specific bit of computer evidence can be admitted to trial. But in substance, what judges really want to know is whether the evidence is reliable.

For computer professionals, this means that if they want their records of messages to be admissible in court, they need to make the records reliable: In data processing terms, they need to place "controls" over the records.

The Poindexter case illustrates the types of controls that can be built into commercial computer systems. First, a competent professional maintained the E-mail network. Second, secure passwords restricted access to the system. Third, the network automatically time-stamped messages. Finally, the computer operating program and the E-mail records were under the exclusive control of a neutral system operator.

As the legal taboos against electronic contracts disappear, companies are finding new and profitable ways to employ messaging technology.

Take the movie industry, for example. Today, when a movie distributor negotiates with a local theater on the marketing of a particular film, the parties strike an agreement by telephone and then formalize it with a paper contract. Now the industry is developing an EDI message to replace the paper contract.

Indeed, as computer professionals gain experience with computer contracts, they can see that the legal issues confronting them can be tamed with appropriate techniques. For IS managers implementing electronic transaction systems, legal issues need only be considered, not feared.

Wright is an attorney in Dallas and author of *The Law of Electronic Commerce: EDI, Fax and E-mail.*

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AT Model 339	$750	$1,000	$700
PS/2 Model 30-286	$1,150	$1,300	$1,000
PS/2 Model 60	$1,300	$1,700	$1,300
PS/2 Model 70P	$3,000	$3,500	$3,000
Compaq Portable II	$750	$1,050	$700
Portable 286	$1,100	$1,350	$1,000
SLT 286	$1,900	$2,200	$1,700
Portable 386	$2,000	$2,100	$1,500
LTE 286	$1,750	$1,900	$1,600
Deskpro 286	$800	$1,000	$700
Deskpro 386/20	$2,150	$3,000	$2,000
Apple Macintosh Plus	$750	$975	$700
SE	$1,125	$1,250	$1,100
II	$2,600	$2,800	$2,400
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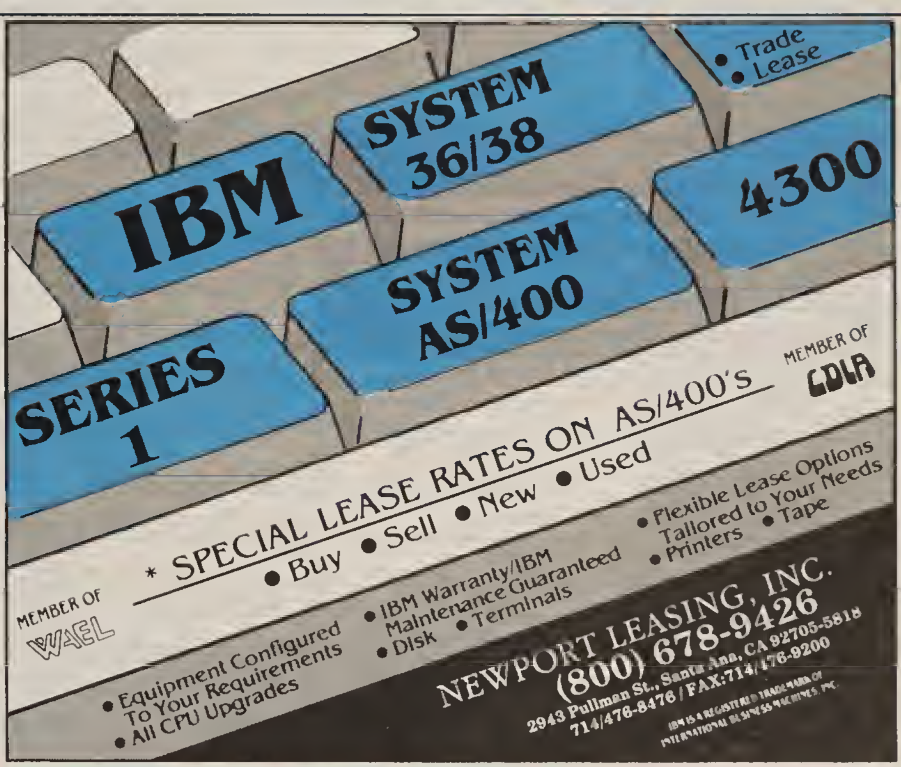

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INVESTMENT FOCUS: PC SOFTWARE

Personal computer software vendors have not been struck by the recessionary 18-wheeler that has mowed down other technology sectors, according to a recent survey conducted by New York-based Bear Stearns & Co. and accounting firm Goldstein, Golub, Kessler & Co.

The poll of 300 U.S. microcomputer managers found that 20% have cut PC budgets this year, but 34% have increased spending on PCs and related products. Meanwhile, many PC software stocks are now trading at or near 52-week highs. Microsoft Corp.'s Windows 3.0 — and the applications coming out to support it — is partly responsible for the current good health of the sector, said Louis Giglio, software analyst at Bear Stearns. Just under 78% of the respondents said they are using Windows 3.0 right now, with 15.5% currently evaluating the graphical user interface.

While companies selling Windows-compatible packages may gain market share and profits in the coming quarters, the here and now may be tumultuous for some firms as customers defer buying decisions while they wait for new products, Giglio said.

Software Publishing Corp. A Windows version of Harvard Graphics is expected to go into beta testing within three months, which means that a market-ready product will not be available until late this year or early 1992, Giglio said. This tardiness does not bode well for Software Publishing stock, which he rated a hold. Shares have slipped nearly 14% in the past six weeks, from 21½ to 18½ as of last Wednesday.

Borland International, Inc. "An ideal software company would have not only leading market share but also increasing share," Giglio said. Borland's product diversity means it does not depend on a single market to drive sales. It continues to gain share in the spreadsheet arena, he said. However, Borland now trades at the high end of its valuation, so Giglio recommends holding the stock.

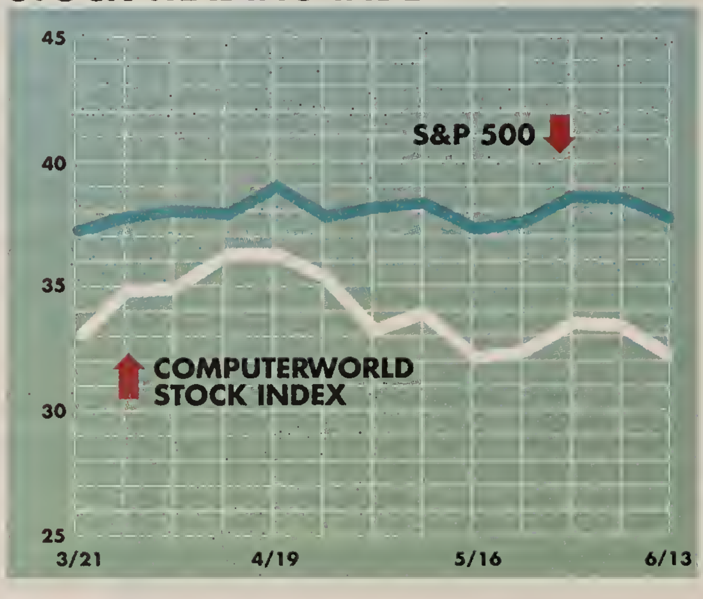
Scott Smith, an analyst at Donaldson, Lufkin & Jenrette Securities Corp., disagrees. "We now look for Paradox for Windows in late 1991, not 1992" as was formerly estimated, he said, adding that new products should ensure continued momentum, making Borland moderately attractive. Investors seem to agree, boosting Borland 3% in recent weeks, from 49¾ to 51⅜.

Lotus Development Corp. Lotus gets 70% of its sales from its 1-2-3 spreadsheet, which makes it overly dependent on one product, according to Giglio. To its credit, however, Lotus is trying to pierce the markets for different platforms, including **Digital Equipment Corp.** minicomputers and **IBM** mainframes. However, the various versions of 1-2-3 are functionally limited because developers have not exploited the best features of each platform, said Giglio, who rated the company a hold.

Others are more optimistic. Lotus will outperform other PC software stocks, according to David Bayer, an analyst at Montgomery Securities, Inc. in New York. Strong sales of 1-2-3 for Windows, scheduled to ship in August or September, will bolster earnings in 1991 and 1992, he said, adding that Lotus will take 29% of the Windows-compatible spreadsheet market next year, compared with Borland's 10%. Lotus stock has slipped 5% since the beginning of May, from 33¼ to 31¾.

KIM S. NASH

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Financial news from Unisys Corp. preceded a ⅜-point stock slide last week to end up at 4 by Thursday. Unisys, which may be close to paying about $190 million in penalties for fraud in vying for U.S. government contracts, also said it will sell its Timeplex, Inc. unit.
- Microsoft Corp. unveiled DOS 5.0, a new version of its operating system. Its stock slid ⅛ of a point to close Thursday at 111. Lotus Development Corp. also declined, dropping ½ of a point to 32.
- Chip stocks fell as the cyclical downturn in semiconductor orders began to show up in the sector's most recent book-to-bill ratio. Intel Corp. dropped 4¾ points to 48¾; Motorola, Inc. lost 3⅝ to finish at 64⅞; Texas Instruments, Inc. stumbled 3½ points to 35⅛.
- Long-distance carrier United Telecom, parent company of U.S. Sprint Communications Co., gained ⅜ of a point to 28½, while MCI Communications Corp. stayed even at 29½.

Computerworld Friday Stock Ticker

PRICES AS OF 2:30 P.M., FRIDAY, JUNE 14, 1991

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Information Int'l	43.94
MAI Systems Corp.	25.00
Televideo Systems	18.02
Datapoint Corp.	16.67
Computer Associates	12.00

TOP PERCENT LOSERS

Micropolis Corp.	-31.76
Pyramid Technology	-30.10
Masstor Systems	-16.67
American Mgmt. Systems	-16.67
Artel Communication Corp.	-15.79

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Adobe Systems Inc.	3.50
Computer Sciences	2.75
Southwestern Bell Corp.	2.25
Harris Corp.	2.00

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Novell Inc.	-3.75

Communications and Network Services — Off 0.17%

Exch	52-Week	Range		June 14 Price	Wk Net Change	Wk Pct Change
OTC	19.00	5.38	3 COM Corp.	8.13	-0.75	-8.45
NYS	69.75	52.50	American Info Techs Corp.	58.00	1.13	1.98
NYS	44.13	29.00	AT&T	37.00	0.63	1.72
OTC	5.63	0.88	Artel Communication Corp.	2.00	-0.38	-15.79
NYS	56.25	39.50	Bell Atlantic Corp.	46.25	1.63	3.64
NYS	56.25	47.00	Bellsouth Corp.	48.00	0.63	1.32
NYS	44.00	13.13	Cabletron Systems	37.38	1.63	4.55
OTC	25.88	8.25	Compression Labs Inc.	18.38	1.13	6.52
OTC	5.13	2.75	Data Switch Corp.	3.25	-0.38	-10.34
NYS	26.13	8.88	Digital Comm. Assoc.	15.63	-0.75	-4.58
OTC	25.25	12.25	Dynatech Corp.	18.75	-1.00	-5.06
OTC	12.88	5.50	Fibronix Int'l Inc.	8.88	0.25	2.90
OTC	3.88	1.75	Gandalf Technologies Inc.	3.50	0.25	7.69
NYS	4.13	1.63	General Datacomm Inds.	3.13	0.00	0.00
NYS	33.50	23.50	GTE Corp.	29.63	0.25	0.85
NYS	63.00	40.25	ITT Corp.	60.00	-1.50	-2.44
OTC	42.88	17.88	MCI Commmunications Corp.	30.00	0.38	1.27
OTC	10.50	2.75	Microcom Inc.	6.25	0.13	2.04
NYS	10.38	4.00	Network Equipment Tech.	9.63	0.13	1.32
OTC	14.63	4.00	Network General	8.25	0.25	3.13
OTC	15.50	8.13	Network Systems Corp.	13.25	-0.50	-3.64
NYS	37.88	22.13	Northern Telecom Ltd.	37.88	0.63	1.68
OTC	58.50	17.25	Novell Inc.	49.50	-3.75	-7.04
NYS	85.13	67.00	Nynex Corp.	70.63	1.63	2.36
NYS	47.50	36.25	Pacific Telesis Group	40.50	1.00	2.53
ASE	15.38	4.75	Penril Corp.	14.50	0.00	0.00
NYS	29.00	8.88	Scientific Atlanta Inc.	13.63	-0.13	-0.91
NYS	57.50	47.25	Southwestern Bell Corp.	52.00	2.25	4.52
NYS	40.50	20.63	United Telecom	28.88	1.00	3.59
NYS	40.75	32.38	U S West Inc.	35.50	-0.13	-0.35

Computer Systems — Off 0.62%

Exch	52-Week	Range		June 14 Price	Wk Net Change	Wk Pct Change
OTC	8.50	0.56	Alliant Computer Sys.	1.13	0.00	0.00
ASE	18.88	10.00	Amdahl Corp.	15.88	-0.38	-2.31
OTC	73.25	24.25	Apple Computer Inc.	41.25	-4.88	-10.57
OTC	11.13	4.25	Archive Corp.	6.88	-0.25	-3.51
OTC	32.75	7.50	AST Research Inc.	22.88	-0.13	-0.54
NYS	9.38	4.00	Bolt, Beranek & Newman	7.88	-0.50	-5.97
NYS	21.63	4.50	Commodore Int'l	14.63	-0.88	-5.65
NYS	74.25	34.13	Compaq Computer Corp.	34.13	-2.63	-7.14
OTC	2.13	0.13	Computer Automation Inc.	1.00	-0.13	-11.11
NYS	19.75	6.75	Control Data Corp.	11.50	0.00	0.00
NYS	20.88	8.38	Convex Computer	17.13	0.13	0.74
NYS	49.75	20.00	Cray Research Inc.	35.38	-1.00	-2.75
NYS	18.13	3.50	Data General Corp.	15.75	-0.50	-3.08
NYS	3.25	0.75	Datapoint Corp.	1.75	0.25	16.67
OTC	30.63	8.25	Dell Computer Corp.	25.13	0.00	0.00
NYS	87.50	45.50	Digital Equipment Corp.	65.38	-1.63	-2.43
NYS	36.13	13.75	Harris Corp.	28.50	2.00	7.55
NYS	55.13	24.88	Hewlett Packard Co.	51.50	0.13	0.24
NYS	139.75	96.25	IBM	100.25	-1.75	-1.72
OTC	13.50	7.75	Information Int'l	11.88	3.63	43.94
OTC	31.50	10.50	Intergraph	28.75	-0.50	-1.71
NYS	2.25	0.50	MAI Systems Corp.	0.63	0.13	25.00
NYS	149.75	114.00	Matsushita Electronics	119.50	1.00	0.84
OTC	23.88	9.00	Mentor Graphics Corp.	17.88	1.00	5.93
NYS	105.88	44.50	NCR Corp.	105.38	0.50	0.48
OTC	31.75	11.00	Pyramid Technology	18.00	-7.75	-30.10
OTC	33.25	9.75	Sequent Computer Sys.	14.00	-0.25	-1.75
NYS	47.25	18.00	Silicon Graphics	32.38	-0.63	-1.89
NYS	37.25	14.63	Stratus Computer Inc.	30.50	-1.88	-5.79
OTC	38.63	15.00	Sun Microsystems Inc.	32.25	-4.00	-11.03
NYS	24.75	8.88	Tandem Computers Inc.	15.38	-0.63	-3.91
NYS	39.50	23.50	Tandy Corp.	32.00	-1.00	-3.03
OTC	29.50	6.75	Teradata	14.63	-1.50	-9.30
NYS	7.88	1.38	Ultimate Corp.	5.13	-0.13	-2.38
NYS	14.63	1.75	Unisys Corp.	4.00	-0.13	-3.03
ASE	5.75	2.00	Wang Labs Inc. (b)	3.75	0.25	7.14

Software & DP Services — Up 0.36%

Exch	52-Week	Range		June 14 Price	Wk Net Change	Wk Pct Change
OTC	63.00	17.00	Adobe Systems Inc.	51.75	3.50	7.25
OTC	13.50	6.75	Aicorp	6.75	-0.75	-10.00
OTC	59.88	20.25	Aldus Corp.	45.75	0.25	0.55
OTC	28.50	12.00	American Mgmt. Systems	21.25	-4.25	-16.67
OTC	18.25	7.50	American Software Inc.	13.50	-0.63	-4.42
NYS	4.63	1.38	Anacomp Inc.	3.50	0.25	7.69
OTC	23.50	10.00	Analysts Int'l	16.75	0.75	4.69
OTC	13.25	4.88	Ashton Tate	11.25	0.13	1.12
OTC	10.25	4.00	ASK Computer Sys.	8.25	-0.13	-1.49
NYS	37.00	22.63	Auto Data Processing	32.00	0.00	0.00
OTC	60.50	32.00	Autodesk Inc.	59.75	1.75	3.02
OTC	31.50	18.50	BGS Systems Inc.	27.25	-0.75	-2.68
OTC	43.88	17.75	BMC Software Inc.	38.75	-0.50	-1.27
OTC	21.50	10.25	Boole & Babbage Inc.	10.25	-0.75	-6.82
OTC	64.25	14.50	Borland Int'l	51.25	0.63	1.23
NYS	8.50	0.44	Businessland Inc.	1.13	0.00	0.00
OTC	20.88	5.13	Cognos Inc.	14.88	-0.63	-4.03
NYS	16.63	4.38	Computer Associates	10.50	1.13	12.00
OTC	17.75	9.50	Computer Horizons	10.75	0.25	2.38
NYS	73.25	36.75	Computer Sciences	68.50	2.75	4.18
NYS	11.50	6.63	Computer Task Group	8.38	0.00	0.00
OTC	25.25	13.00	Comshare Inc.	19.75	0.13	0.64
OTC	16.00	3.75	Corporate Software	10.25	-0.13	-1.20
NYS	49.00	27.88	General Motors E (EDS)	47.13	-1.63	-3.33
OTC	18.75	7.25	Goal Systems Int'l	14.00	-0.25	-1.75
OTC	7.00	1.88	Hogan Systems Inc.	5.81	-0.06	-1.06
OTC	23.63	7.75	Information Resources	21.25	0.63	3.03
OTC	17.50	2.63	Informix Corp.	6.00	0.25	4.35
OTC	7.88	1.38	Intellicorp Inc.	1.81	0.19	11.57
OTC	8.25	2.50	Interleaf Inc.	6.38	0.00	0.00
OTC	15.88	6.88	Intersolv	9.00	-0.25	-2.70
OTC	43.25	10.00	Knowledgeware Inc.	28.00	0.75	2.75
OTC	45.00	16.75	Legent Corp.	31.38	-0.88	-2.71
OTC	38.00	12.50	Lotus Development	32.75	0.50	1.55
OTC	32.00	13.63	Micrografx	16.50	1.50	10.00
OTC	117.50	50.75	Microsoft Corp.	111.75	1.50	1.36
NYS	10.50	4.00	On Line Software Int'l	9.75	-0.13	-1.27
OTC	24.00	4.88	Oracle Systems	9.13	-0.13	-1.35
NYS	14.63	7.00	Pansophic Systems	12.25	0.13	1.03
OTC	9.25	1.25	Phoenix Technologies	7.50	0.00	0.00
NYS	52.00	33.38	Policy Management Sys.	49.00	0.75	1.55
NYS	23.13	11.50	Reynolds & Reynolds	21.50	-1.13	-4.97
OTC	27.25	14.75	SEI Corp.	26.50	0.75	2.91
OTC	22.75	12.50	Shared Medical Systems	20.00	-0.38	-1.84
OTC	35.25	12.00	Software Publishing Corp.	19.50	0.00	0.00
NYS	14.63	5.50	Sterling Software	13.00	-0.50	-3.70
OTC	26.00	9.50	Sungard Data Sys.	17.25	-0.25	-1.43
OTC	55.88	17.75	Symantec Corp.	43.00	1.63	3.93
NYS	22.63	4.50	System Center Inc.	9.00	0.13	1.41
OTC	37.25	12.50	System Software Assoc.	15.13	0.13	0.83
OTC	24.13	4.75	Weitek	11.50	0.25	2.22

Semiconductors — Off 3.99%

Exch	52-Week	Range		June 14 Price	Wk Net Change	Wk Pct Change
NYS	14.25	3.63	Advanced Micro Devices	12.75	-0.25	-1.92
NYS	12.50	5.50	Analog Devices Inc.	10.13	-0.13	-1.22
OTC	21.75	5.25	Chips & Technologies	9.13	0.25	2.82
OTC	59.25	28.00	Intel Corp.	48.63	-3.63	-6.94
NYS	13.00	5.13	LSI Logic Corp.	9.00	-0.63	-6.49
NYS	19.13	6.75	Micron Technology	14.25	-1.38	-8.80
OTC	20.88	7.25	MIPS Computer Systems	14.50	-0.88	-5.69
NYS	88.38	45.75	Motorola Inc.	65.25	-1.38	-2.06
NYS	8.38	3.00	National Semiconductor	6.50	-0.13	-1.89
NYS	47.63	22.50	Texas Instruments	35.88	-1.88	-4.97
OTC	12.25	3.00	VLSI Technology	9.38	-0.25	-2.60
ASE	14.25	4.00	Western Digital Corp.	4.25	-0.38	-8.11

Peripherals & Subsystems — Off 3.47%

Exch	52-Week	Range		June 14 Price	Wk Net Change	Wk Pct Change
OTC	2.75	0.88	Apertus Technologies	1.88	-0.06	-3.25
OTC	22.63	7.50	Banctec Inc.	13.00	-0.25	-1.89
OTC	17.50	4.25	Cambex Corp.	12.75	0.88	7.37
ASE	11.75	4.13	Cognitronics Corp.	8.25	-1.00	-10.81
NYS	31.25	14.63	Conner Peripherals	17.75	-1.50	-7.79
ASE	22.00	7.00	Dataram Corp.	10.88	-1.00	-8.42
NYS	13.00	4.25	EMC Corp.	11.25	0.38	3.45
NYS	47.25	33.75	Eastman Kodak Co.	41.88	-0.88	-2.05
OTC	11.25	4.75	Emulex Corp.	8.38	-0.50	-5.63
OTC	32.25	14.00	Evans & Sutherland	18.75	-0.75	-3.85
OTC	6.50	3.88	Iomega Corp.	5.50	0.00	0.00
OTC	28.25	6.75	IPL Systems Inc.	22.00	-1.75	-7.37
OTC	1.50	0.13	Masstor Systems	0.63	-0.13	-16.67
OTC	15.88	2.63	Maxtor Corp.	3.88	-0.38	-8.82
OTC	18.00	4.38	Micropolis Corp.	7.25	-3.38	-31.76
NYS	95.63	73.63	3M Corp	94.88	1.88	2.02
OTC	13.63	6.00	Printronix Inc.	6.25	-0.25	-3.85
NYS	24.75	8.50	QMS Inc.	21.63	1.88	9.49
OTC	18.25	8.25	Quantum Corp.	10.00	-1.25	-11.11
NYS	7.63	4.38	Recognition Equipment	7.25	-0.13	-1.69
OTC	11.50	4.00	Rexon Inc.	9.25	-0.25	-2.63
OTC	19.88	5.63	Seagate Technology	9.38	-1.13	-10.71
NYS	47.00	11.00	Storage Technology	40.50	-3.00	-6.90
OTC	4.75	1.25	Tandon Corp.	3.31	-0.06	-1.84
NYS	26.38	11.63	Tektronix Inc.	25.88	2.00	8.38
OTC	0.53	0.16	Televideo Systems	0.41	0.06	18.02
NYS	60.13	29.00	Xerox Corp.	54.25	0.63	1.17

Leasing Companies — Off 2.11%

Exch	52-Week	Range		June 14 Price	Wk Net Change	Wk Pct Change
OTC	16.25	7.00	Amplicon Inc.	15.00	-1.25	-7.69
NYS	28.38	14.63	Comdisco Inc.	24.25	-0.50	-2.02
OTC	16.25	9.25	LDI Corporation	14.50	-0.13	-0.85
OTC	5.75	2.25	Selecterm Inc.	3.75	0.00	0.00

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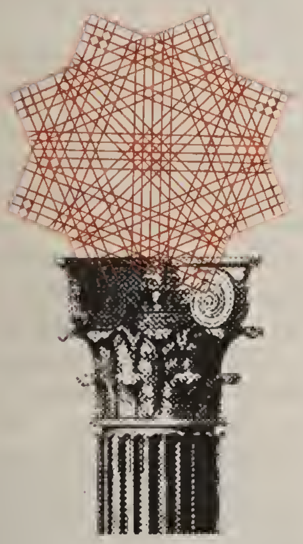
Awards praise the human touch

CW, Smithsonian honor high tech's heroes

BY NELL MARGOLIS
CW STAFF

CBS news correspondent Ed Bradley ventured beyond *60 Minutes* last week to co-host the Third Annual *Computerworld* Smithsonian Awards in Washington, D.C. The gala affair attracted some 650 members of the technology, business, academic and government communities, who gathered to honor technological achievements best measured not in benchmarks but as landmarks in humanity's effort to make the world a safer, saner place.

"It's good to see so many executives of leading companies here, while Mike Wallace is at your corporate headquarters seeking targets of opportunity," Bradley kidded.



On a more serious note, Bradley underscored information technology's seminal role in the sweeping changes that have literally remapped the globe since last year's awards were handed out. When people — enabled by real-time media coverage of major news events — "can really see what it's like to live in a free country," he noted, "they begin to want it. And once that genie is out of the bottle, it can never be put back in."

Nominations for the awards are made each year by the Chairmen's Committee, a group composed of the heads of leading technology companies. Nominees — whose number has grown from approximately 100 in the competition's first year to almost 300 in 1991 — are judged on their positive impact on society, their success in meeting the goals of their targeted niches and the degree of technological innovation they demonstrate. Winners are chosen by judges that this year included technology guru Alan Kay, American Airlines' information systems head Max Hopper and journalist Judy Woodruff.

The Third Annual CW Smithsonian Awards *took place in Washington, D.C.'s National Building Museum*

"What really gets to me about the Smithsonian awards," said Philip Conkling, executive director of 1991 finalist Island Institute, "is that here is a room full of movers and shakers and incredible applications — but the most amazing thing is the effect at the community level."

That community impact spirit was brought home repeatedly throughout the evening. North Carolina junior high school teacher Gail Morse roused a cheer from the audience when she asked her two teenage daughters to rise and help her accept the second annual Siemens Information Technology Leadership Award for Science Education (see page 91). Washington, D.C., teacher Paul Kaiser drew applause when he said he was taking his school's *Computerworld* Smithsonian Education trophy (see story below) back home "to my students, because this belongs to them."

"These people are heroes," Patrick J. McGovern, chairman of International Data Group, Inc., *CW's* parent firm, said of the nominees, "not just for what they achieve but for what they inspire others to achieve."

The 1991 CW Smithsonian winners

Business and Related Services

Frito-Lay, Inc.

There are many reasons why Frito-Lay, Inc. rings up almost half of the $9.8 billion annual retail sales of snack chips in the U.S. But one of the main reasons, observers say, is the company's use of technology to support a total restructuring of the way the snack foods giant does business.

"What they've done indicates how other organizations will be run in the future," says James Cash, a professor at the Harvard School of Business.

In less than six years, the Pepsico, Inc. subsidiary dismantled its highly centralized management structure, distributing decision-making to the regional level. Technology helps top executives maintain control by giving them up-to-the-minute information about the business.

A key part of Frito-Lay's information system are handheld computers used by each of the company's 10,000 sales representatives to track sales and pricing data. This data from 400,000 weekly sales calls is fed nightly into minicomputers at 215 distribution centers. The minicomputers send the data to the firm's Dallas headquarters, where a central IBM mainframe DB2 relational database holds sales data about competitors.

More than 250 managers and executives use decision support systems applications to access that database. They can get information on sales, profits, promotions and competitors divided by region, type of store and product line. "The key benefit is maintaining service at the field level," says Charles Feld, vice president of MIS.

Specific payoffs include the following:

- Management saves $20 million annually from better inventory control and can track the competition and respond immediately.
- Sales reps save three to five hours weekly, make fewer errors and use hard data to negotiate for shelf space.
- Stores get fresher products, more efficient deliveries and more data about which products sell best. — *Susan Nykamp*

Education and Academia

The Lab School of Washington

The inner world of a learning-disabled child is, quite often, all that child has.

Getting through to that inner world is most of a teacher's job; getting a child to link his world to the life around him is the rest. So when Paul Kaiser, a teacher at The Lab School of Washington, D.C., discovered Apple Computer, Inc.'s Hypercard in 1988, he thought he had a tool that could help him do both.

Three years later, more than 50 of Kaiser's learning-disabled students have become more adept at expressing themselves and are learning by designing stories using self-authored Hypercard stacks — series of

Continued on page 90

Continued from page 89

images employing such diverse techniques as animation, scanned photography and writing. The equipment was donated by the students' grandparents and parents.

Kaiser has each student describe his story, then make a physical model of some of the scenes using clay, sticks and other materials.

When the model is complete, the students proceed to building the Hypercard stack, deciding as they go which techniques to use. Some prefer animation; some, straight text; and some, photography, Kaiser says.

The variety of multimedia choices enables students to select the method of expression they are most comfortable with. Meanwhile, the authoring process forces them to understand how others will see the story, Kaiser says.

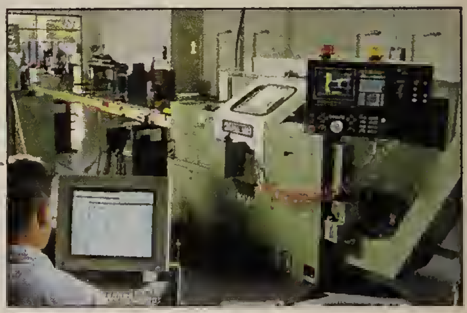
"With this [technology], we can focus on what the kids can do, which is a much more positive approach. And we can also sneak in the back door and address some of the things they can't do." — *Donald St. John*

Manufacturing

Raychem Advanter

As the first of Raychem Corp.'s manufacturing plants to adopt plantwide computer-integrated manufacturing (CIM), Raychem Advanter has become a showcase for paperless, automated production systems.

Managers at the Richmond, British Columbia, facility have been able to carve out a market niche in filling small, custom part orders. Advanter makes and assembles special aluminum adapters used in wiring harnesses. The adapters attach connecting devices to the harness, sealing against moisture, contaminants and interference from electromagnetic or radio frequencies.



Raychem Advanter enables customers to purchase in lot sizes as small as 15 units, instead of hundreds or thousands, says Jim Balcom, a manufacturing consultant at Coopers & Lybrand in Vancouver, British Columbia. Furthermore, lead time is weeks, not months.

The plant hardware consists of 14 Sun Microsystems, Inc. workstations that run computer-aided design (CAD) machining and intelligent documentation systems from Symix Computer Systems, Inc. and Cimlinc, Inc.

With Cimlinc's Integration Product Process tool, Advanter's different manufacturing systems, databases and applications packages interoperate without paper.

For example, an order is faxed and received by the Sun Sparcstation, triggering the Symix CAD system for the job part and quantity. That begins the computer-aided manufacturing (CAM) sequence, which moves the job into a CAM file and then releases it to the shop floor. The order appears in a Cimlinc intelligent documentation form at the tool presetting station, where a technician schedules the task. — *Maryfran Johnson*

Environment, Energy and Agriculture

Research Alternatives, Inc.

When thousands of gallons of oil spilled into Pennsylvania's Monongahela and Ohio rivers in 1989, the Emergency Information System was there. When Hurricane Hugo barreled into the Puerto Rican coastline, the Emergency Information System was there. When Jamaicans began rebuilding their lives after the fury of Hurricane Gilbert, the Emergency Information System was there.

Since 1983, emergency workers in these disasters — and hundreds more — have used Research Alternatives, Inc.'s personal computer-based Emergency Information System software to plan, coordinate and track evacuation and relief efforts.

Research Alternatives President James W. Morentz, holder of a Ph.D. in crisis management, founded the Rockville, Md.-based firm on the idea that information is the critical component in saving lives and protecting the environment during disaster. By combining geographic and demographic data with sophisticated computer modeling of the effects of a disaster, the Emergency Information System acts as the command-and-control center for emergency efforts.

The software is used by more than 100 major chemical and petrochemical companies to do emergency and evacuation planning. Johnson & Johnson has installed the product at most of its manufacturing plants in New Jersey and is in the process of bringing it to Europe.

"We use Emergency Information System for . . . vulnerability assessment, emergency training and as an important tool in a potential emergency," says Lawrence Mondschein, Johnson & Johnson's manager of chemical information and control.

Although a small company with 30 employees, Research Alternatives now boasts more than 1,000 installations of Emergency Information Systems in the U.S. and 13 other countries. — *Clinton Wilder*

Finance, Insurance and Real Estate

SWIFT

If you're on the supplicant's side of the loan desk, a bank's internal procedures can seem interminable. But worldwide message processing and communications for financial institutions are handled by a system that's positively SWIFT.

The Society for Worldwide Interbank Financial Telecommunications (SWIFT) has put together a computerized global system, also called SWIFT, that handles a vast amount of the essential information banks exchange daily. The 125 standard messages the SWIFT network deals with range from buy-and-sell stock orders to confirmation of deposits in an account.

On-line since 1977, the system is available to major financial centers, such as London, Zurich and New York, says Richard Metcalfe, spokesman for the society. It is operational in 72 countries at 3,000 institutions, such as banks and stock exchanges. Users pay a yearly fee as well as a charge for each message sent.

SWIFT's system runs out of two operating centers in Virginia and in the Netherlands. Processors at the centers store and forward messages received from processors in the 72 countries. These machines are connected to user terminals at specific institutions.

The artificial intelligence-based system control processor monitors operations in real time, operating nonstop. The program responds to systems problems, alerting network operators only of those problems that need human intervention.

Security is important, so the system uses authentication of message origin, encryption and decryption and message integrity verification. To ensure uptime, the system is redundant. — *Carol Hildebrand*

Government and Nonprofit Organizations

De Anza College

Finding a job is tough during this recession, but it's even tougher if you are disabled. The Bay Area Coalition for Employment of Persons with Disabilities (BACED), formed in 1987 from 11 San Francisco-area government and private placement agencies, uses a 2-year-old computer network to help the disabled overcome the obstacles of distance and time that often prevent them from getting jobs before nondisabled people get them.

Frustrated with a slow, unreliable job placement system that ran on telephones, index cards and coffee, BACED founder Deborah Stern, a senior employment specialist at De Anza College, a Cupertino, Calif., community college with a special education division, hit upon the idea of electronically posting the job listings pooled from member agencies.

To make it happen, Stern applied for a grant from Apple Computer, Inc. for networked computers to link the job agencies. By 1988, Apple had donated 11 Macintosh SEs, including a central-site node with 40M bytes of main memory at De Anza.

Fifteen placement agencies now share the BACED job postings, communicating with De Anza via donated, dial-up 1,200 bit/sec. modems. Job applicants register with one of the placement agencies for a fee that's approximately $3.50 for 12 weeks at De-Anza.

Job counselors now have access to 10 times as many listings than were known to any placement agency before.

The jobs network went into full swing in 1989. Since then, some 1,400 job listings and notes have been posted electronically. Hundreds of jobs are filled through the network yearly; at De Anza alone, roughly 70 disabled people are placed into new jobs each year. — *Jean S. Bozman*

Media, Arts and Entertainment

The Tenderloin Times

The Tenderloin is one of the toughest neighborhoods in San Francisco. An inner-city, low-income community of 25,000 mostly elderly, disabled and immigrant residents, it has all of the problems — drugs, crime, illness, homelessness — that plague similar areas in the U.S.

But thanks to a core of crusading journalists armed with desktop publishing systems from Apple Computer, Inc., the Tenderloin also has a growing measure of dignity, unity and clout. In short, it has *The Tenderloin Times*.

This 14-year-old neighborhood news monthly, which is distributed free of charge to some 15,000 readers, is a quadrilingual paper that is available in English, Laotian, Cambodian and Vietnamese.

In 1986, the tiny and underfunded *Tenderloin Times* staff was able to produce its then-new Southeast Asian section only by hand-calligraphing the Laotian and Cambodian pages; Vietnamese text was typed, with diacritical marks added by hand.

Apple's donation of two Macintosh SEs and a laser printer let the staff typeset all four languages in-house. Today, says *Tenderloin Times* editor Sara Colm, an entire desktop publishing system is in place — and in constant use by editors, ad designers and translators.

Always a figurative lifeline to its polyglot community, *The Tenderloin Times* is often a literal one as well. During the 1988 San Francisco earthquake, many Cambodian Tenderloiners, who were unfamiliar with quakes but familiar with war, thought they were under attack and fled their homes.

The paper rushed an earthquake extra to press, giving its readers not only their first explanations of what was occurring but also critical medical and safety information.

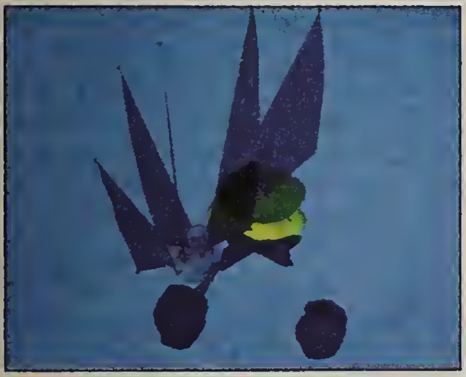
Going electronic has had a positive business effect as well, Colm says. It has streamlined production, cut costs and given the product a professional appearance that attracts advertisers. The computers have even made it possible for the nonprofit paper to develop a translation service that is kicking in $14,000 to support the newspaper. —*Nell Margolis*

Medicine

Joint Center for Radiation Therapy

Slicing off tiny tumors growing near someone's brain stem is tricky business for even the most adept neurosurgeon. Accidentally nicking a nerve that connects the spinal cord to the brain can paralyze the patient.

For the past two to three years, some cancer specialists have opted instead to use stereotactic radiosurgery, which disintegrates tumors with radiation beams. No cutting is required.



Like surgery, this procedure is risky. If the radiation stream is too big, or if it bounces off the tumor onto healthy tissue, nerve or brain damage can occur. But a software application that combines imaging with high-speed computations makes the process a little less worrisome for patients in Boston's Stereotactic Radiosurgery Program at the Joint Center for Radiation Therapy. The center is sponsored by Brigham and Women's Hospital and Harvard Medical School.

Based on a graphics applications development utility from Stardent Computer, Inc., Xknife turns computerized scans of a patient's head into three-dimensional models showing the brain tumor and the surrounding area. The point-and-click application, which runs on a Stardent Vistra 800 desktop visualization system, pinpoints a patient's specific tumor type and location.

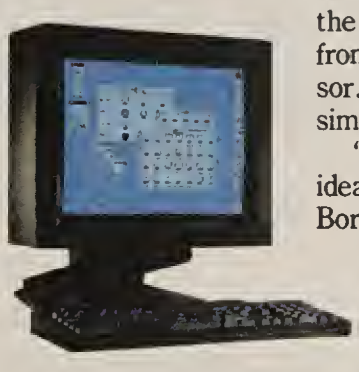
Xknife then uses 12 million floating-point operations per second of computing power to calculate treatment specifics such as the width, intensity and angle of penetration of the radiation beam.

Xknife has already been used in treating 30 cancer patients at the Joint Center, some of whom had tumors so small or so close to sensitive areas that they would have been untreatable by traditional surgery, says Dr. Hanne Kooy, who co-developed the program with software engineer Marc Dopheide. —*Kim S. Nash*

Science

Next Computer, Inc.

Godzilla is alive and well in Tokyo today. He also lives in London, Boston, Washington, D.C., Redwood City, Calif., and other places.



This tamed Godzilla, or Zilla for short, lives on Next Computer, Inc. workstations in all of these cities, transformed from destructive force to number cruncher for Next as well as some 90 beta-test sites.

Zilla is an application designed by Dr. Richard Crandall, Next's chief scientist, to run the kind of CPU-intensive problems normally done on supercomputers but using the idle CPU power of unused workstations. At Next, a Zilla unit consists of 100 Next machines, which run the Zilla application in background. So far, Zilla has been used by Crandall to work on several high-level math problems and by Pixar, Inc. to create animated films, which can require 100 hours of computer time per second of motion and can be done in weeks instead of years using Zilla.

Zilla is actually not a new concept. It essentially works as a loosely coupled parallel processor, and other vendors sell systems with similar abilities to distribute applications to a variety of machines. What it has that others do not, Crandall says, is a feature that recognizes when users are on a system. At that point, the program backs away from their microprocessor. It is also relatively simple to use, he says.

"It's a very clever idea," says Robert R. Borcher, associate director of computing at the Lawrence Livermore National Laboratory in Livermore, Calif., a Zilla beta-test site. Borcher says Zilla's capacity is best for loosely coupled applications such as number factoring, transaction processing or "Monte Carlo" — a statistical procedure used to investigate problems such as how neurons interact with matter.

Zilla was co-developed by Josh Doenian, a scientific programmer at Next. —*Michael Fitzgerald*

Transportation

United Parcel Service, Inc.

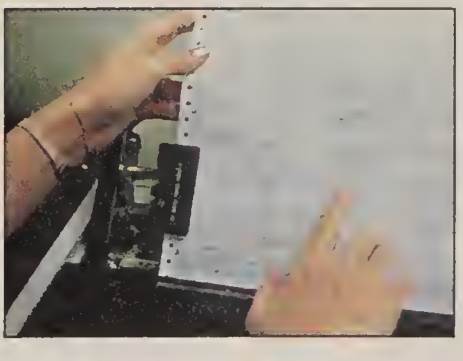
After Gaylord Evans started using United Parcel Service, Inc.'s international delivery instead of air freight, he never looked back. His company, MCM Distributors, Inc. in Costa Mesa, Calif., sells miniature car kits made in Europe. By using UPS, he shaved 6% off shipping costs and cut delivery time from 10 days to two.

UPS would credit Evans' satisfaction to its International Shipment Processing System (ISPS), which automates all facets of international package transport and delivery. The system enabled UPS to expand to 180 countries in three years, reports Steven Heit, information services planning manager.

ISPS is built around an IBM mainframe 35G-byte DB2 database for on-line transactions and batch processing that is linked to remote personal computers, local-area networks and bar-code scanners.

By automating accounting, scheduling and tracking functions and streamlining customs and brokerage tasks, the system lets UPS offer cost-effective, fast international delivery — usually within 48 hours, Heit says. ISPS stores data on customer shipping patterns, automatically generates required forms and schedules optimal use of aircraft.

For exporters and importers, in addition, customs processing is expedited by two ISPS features: a prealert notification system, which gives agents detailed shipping information before a package arrives, and electronic data interchange, which allows customs agents to enter data directly into government systems. —*Susan Nykamp*



ISPS automates billing, tariff classification and tax and duty calculations.

Benefactors Awards

MCI Communications Information Technology Leadership Award for Innovation: Erich Bloch. Bloch was head of the National Science Foundation (NSF) for six years, where he was charged with strengthening national scientific and engineering research and education. While at NSF, he created the national centers for computing competence and received the National Medal of Technology and the IEEE 1990 Founders Medal.

Price Waterhouse Information Technology Lifetime Achievement Award: Robert Noyce (posthumous). Sometimes called the father of Silicon Valley, Noyce (1927-1990) was a seminal influence in the electronics industry. He was co-inventor of the integrated circuit, as well as co-founder of Fairchild Corp. and Intel Corp., two of the electronics industry's most influential companies. Noyce was chairman of Sematech at the time of his death.

Siemens Information Technology Leadership Award for Science Education: Gail Morse. Morse, a seventh-grade science teacher at J. M. Alexander Junior High School in Huntersville, N.C., has brought technology to bear on a whole new business-oriented approach to working with at-risk students. Use of computers and project teams has resulted in drastic reductions in dropouts and absenteeism while increasing language and math scores.

NEWS SHORTS

Lotus Realtime rises for Sun

Lotus Development Corp. gave 1-2-3 for Sun Microsystems, Inc. users real-time access to financial data last week. In so doing, it picked up an endorsement from EJV, a consortium charged with creating a standard computing platform for the six Wall Street information firms. A Lotus spokesman said Lotus Realtime will be extended to Digital Equipment Corp.'s Ultrix, adding that an upgrade to 1-2-3 for AT&T's Unix System V is on the way. Version 1.1 of 1-2-3 for Sun's Scalable Processor Architecture systems is based on core 1-2-3 for DOS technology and incorporates support for the X/11 Release 4 Windows environment for Lotus' Realtime and for Lotus' C add-in tool kit. Also bundled in is a Sybase, Inc. SQL Server Datalens driver and improved network licensing management.

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Split decision for Apple

Last week, U.S. District Judge Vaughn Walker refused to reconsider an earlier ruling that absolved Apple Computer, Inc. of misleading federal authorities about the nature of some of its copyrighted visual display elements. This setback in Microsoft Corp. and Hewlett-Packard Co.'s defense against Apple's charge of copyright infringement was accompanied by the judge's indication that he would allow Apple to amend its complaint to encompass Microsoft's Windows 3.0. The charge previously applied only to Windows 2.03 and HP's New Wave. However, Walker rejected Apple's move to add fraud charges against Microsoft and HP.

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IBM a step ahead on chips?

IBM has the lead in 16M bit-memory chips — but products using the chips are still about one year away. According to a published report last week, IBM is a few months ahead in its production of the high-density chips compared with Japanese competitors such as Hitachi Ltd., NEC Corp. and Toshiba Corp. However, an IBM spokesman said the chips will not be used in commercially available products until mid-1992.

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Peterson joins Parallan board

Retiring Merrill Lynch & Co. information systems chief DuWayne Peterson (see story page 54) wasted little time in taking on a new responsibility. He was named last week to the board of directors at Parallan Computer, Inc., a Mountain View, Calif.-based file server vendor headed by former MAI Basic Four Chief, Inc. Executive Officer William B. Patton Jr.

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Ford to expand network

AT&T announced last week it would extend Ford Motor Co.'s corporate private voice and data network to 5,500 Ford and Lincoln/Mercury dealers nationwide. Terms of the contract for Ford Net were not disclosed. AT&T implemented the original Tariff 12 custom network for Ford in 1988.

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AT&T offers VSAT E-mail

AT&T Easylink electronic mail customers will now have the option of satellite delivery under an agreement announced last week between AT&T Easylink in Basking Ridge, N.J., and Mainstream Data, Inc. The option, slated to be available later this year, will use very small-aperture terminal technology. The service is targeted at the petroleum industry's oil wholesalers and retailers, which will be able to receive daily petroleum price quotes in the oil fields.

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Court win for Microsoft

Microsoft and Everex Systems, Inc. won a 13-month-old civil counterfeiting/copyright and trademark infringement case against eight California defendants and will receive approximately $4.3 million in damages. A U.S. District Court jury in northern California found that J & S International, JIP Design, American Multisource, Inc., Manufacturing Service, Inc., Joe Folk, Benny Lee and Norman and Susan Chan made and used fake versions of Parcorp, a trademarked version of MS-DOS that Everex licenses from Microsoft.

IBM, Apple consider technology exchange

BY PATRICIA KEEFE
CW STAFF

Industry speculation ran rampant last week about a reported pending alliance between IBM and Apple Computer, Inc. that would give IBM's RISC System/6000 chip set to Apple and allow IBM access to System 7.0 features.

The bottom line, according to industry sources, is that the two companies are talking about technology exchanges around Unix and reduced instruction set computing (RISC).

A source close to executives in both companies confirmed that IBM and Apple have been talking and that an agreement is nearly hammered out.

A user at a large IBM site added that in a recent conversation with an IBM executive, it was "strongly hinted" that IBM would shortly announce an alliance "that will rock the industry."

Another source, citing contacts at both IBM and IBM said that at a meeting last Monday, the two firms talked about several things: some kind of RISC chip set agreement, interface technology, operating systems and Apple's Quicktime multimedia software. IBM is "real interested" in licensing part or all of the recently unveiled Quicktime, the source said.

There are unconfirmed reports of a proposed joint venture to develop an operating system. Sources said both vendors are looking at improving their Unix offerings, IBM's AIX and Apple's AUX. Apple already has a project under way, called Pink, to port a superset of System 7.0 into AUX, sources said.

IBM is said to be interested in adding similar technology to AIX, with some carryover into OS/2's Presentation Manager. Because Pink is a portable operating system, there could be repercussions for IBM's portable OS/2 efforts as well.

"The two companies realize that there are some rather significant market realities that are shaping the industry," one industry observer said.

Police

FROM PAGE 1

generally announce themselves to the top executive in the firm and ask that all work being done on personal computers at the time be stopped immediately.

"They adamantly requested an on-site inspection of the software, and we had two choices: We could either cooperate, or they would line people up against the wall and go look at the computers that way," said a source at a New York publishing firm that was raided by the SPA early last year.

Users added that SPA representatives have dealt with them fairly, and many said that in the end, they were relieved that the raid had forced company management to take piracy seriously.

"It was a company policy to distribute software freely and have only one license copy," said Michael Fitzpatrick, computer technician at Versatron Corp., an aerospace design firm in Healdsburg, Calif. Fitzpatrick said he disagreed with the policy and had recommended to company management that they license all pirated software.

Anyone listening?

The recommendations fell on deaf ears, and Versatron was raided last December by a team of seven federal marshals and SPA representatives.

The auditors strode in and told Versatron employees to save their work and immediately step away from their PCs. They then audited each of the company's 30 PCs, a process that took most of the day.

"They were real hard-nosed when they came in," Fitzpatrick said. "They weren't rude, but they were certainly pushy. After a couple of hours, when they saw we weren't trying to cover up, they lightened up."

Versatron ended up paying a $60,000 fine and was required to buy copies of Autodesk, Inc.'s Autocad, Lotus Development Corp.'s 1-2-3 and Manuscript, Ashton-Tate Corp.'s Dbase and other software at full retail price. Fitzpatrick said he has no regrets that the SPA raided his firm. "I'm glad they did," he said.

During a raid, federal marshals watch as SPA representatives check each hard drive using an SPA product called Spaudit [CW, Dec. 10, 1990]. They print out lists of the *.EXE files on each hard drive.

Then the SPA puts together a list of its findings and challenges the company to prove that it owns the software on its hard drives. "We do our best to work with management under the circumstances," an SPA spokeswoman said. "We are not there to be disruptive or adversarial in any way."

No hardware or software is impounded or restricted — although a suit is filed against the company accusing it of violating copyright laws, and an injunction is installed that forbids the company from removing programs from its hard drives or erasing the drives.

Not all of those contacted by *Computerworld* said they knew their companies were violating copyright laws, but several said they did. Fitzpatrick said his board of directors had even asked him what he thought the chances were of being raided. "I gave it a one-in-10 chance," he said.

Eyes focus on Trueimage

BY JAMES DALY
CW STAFF

The future of Microsoft Corp.'s efforts to grab a chunk of the printer software industry turned to uncertainty last week after the quiet departure of its leading evangelist and the restructuring of the group's business unit.

General Manager Cal Bauer had spent nearly the past two years crusading for Microsoft's Trueimage page description language as an alternative to Adobe Systems, Inc.'s entrenched Postscript. The Redmond, Wash.-based giant, however, has found rough sledding in the market. Only a few smaller firms have agreed to license the technology since it was co-announced with Apple Computer, Inc. in September 1989.

Despite the turbulence, Microsoft officials said their page description language efforts will continue unabated. Trueimage code has been going out to printer manufacturers since October.

The Trueimage engineering team, which had been located in Taiwan, will be consolidated at company headquarters in Redmond, Wash.

Although Microsoft's declaration of war on Adobe had caused some industry soothsayers to predict the demise of Adobe, the Mountain View, Calif.-based company has held firm.

In recent months, Adobe has lured back Apple and inked important licensing agreements with firms such as IBM, Digital Equipment Corp. and Silicon Graphics, Inc.

"[Microsoft] has not taken any business away from us," Adobe President Charles Geschke said. "It's one thing to say you want to be in the business; it's another thing to go out and actually do it."

Low-priced IBM 386SXs debut

BY RICHARD PASTORE
CW STAFF

WHITE PLAINS, N.Y. — The four IBM Personal System/2 models introduced last week drew less attention for what they did have than for what they did not have — namely, IBM-style high prices and the Micro Channel Architecture (MCA).

As expected, IBM unveiled models based on the Intel Corp. 20-MHz 80386SX microprocessor. The diskless Model 35 LS and Model 35 SX are now the firm's low-end 386 entries.

The new Model 40 SX offers more expansion and storage than the Model 35, while the higher end Model 57 SX comes with the 32-bit MCA bus and a new 2.88M-byte floppy disk drive.

Users and analysts called pricing for the Model 35 SX and 40 SX, in particular, unusually aggressive for IBM.

Framingham, Mass.-based Technology Investment Strategies Corp. rated the PS/2 Model 40 SX as a 40% price/performance improvement over the PS/2 Model 30 286. The Model 57 SX is a 20% price/performance improvement over the older Model 55 SX.

Price relief

At New York Life Insurance Co., the list prices, coupled with the typical corporate discount, are a relief from internal price pressure.

"Our agents have been coming to me with the newspaper and pointing to ads for Dell, ALR and AST and asking how I can justify these [IBM] prices," said Thomas Casey, senior applications project specialist at New York Life's Boston office. Aggressive pricing on IBM's part should make justification easier, he said.

Coupled with recent price cuts and a new IBM trade-in program (see story page 16), the low-priced rollouts are a necessary response to market pressures, observers said.

"With Compaq's aggressive pricing posture now, IBM needed to do something," said James Miller, vice president of information systems at James River Corp. in Richmond, Va.

Users said they are also glad to see three of the machines leave out the expensive and underutilized MCA bus. "I haven't seen any benefit from the Micro Channel at all," Casey said.

"Anytime you buy a Micro Channel board, it costs you $200 more. And there aren't a lot of people making those boards," said Bruce Greif, project analyst at County Natwest, Inc. in New York.

Room on the bus

Three of the new IBM Personal System/2 models use the once-discredited AT bus

Base configurations	Model			
	57SX	40SX	35SX	35LS
Processor	20-MHz 386SX	20-MHz 386SX	20-MHz 386SX	20MHz 386SX
Bus	Micro Channel	AT	AT	AT
Memory	4M bytes	2M bytes	2M bytes	2M bytes
Hard disk	80M- or 60M-byte	40M- or 80M-byte	None or 40M-byte	None
Floppy disk	2.88M-byte	1.2M- or 1.44M-byte	1.2M- or 1.44M-byte	None
Graphics	16-bit VGA*	16-bit VGA	16-bit VGA	16-bit VGA
Price	$3,625 - $4,195	$2,925 - $3,195	$1,995 - $2,525	$2,695

*Video Graphics Array

Source: IBM

CW Chart: Doreen St. John

Users call DOS 5.0 well-crafted

ANALYSIS

BY CHRISTOPHER LINDQUIST
CW STAFF

MS-DOS 5.0's new features offer plenty of improvement over previous versions, but there are some hitches corporate users should watch for in order to smooth the transition.

DOS 5.0 features an enhanced DOS shell, much-improved memory management, a task switcher and more. Electronic bulletin board chatter and interviews with early users indicate that Microsoft Corp. did this DOS right. And most users report having no problems whatsoever installing the upgrade.

However, some users should be prepared to perform a few minor modifications to get DOS 5.0 up and running.

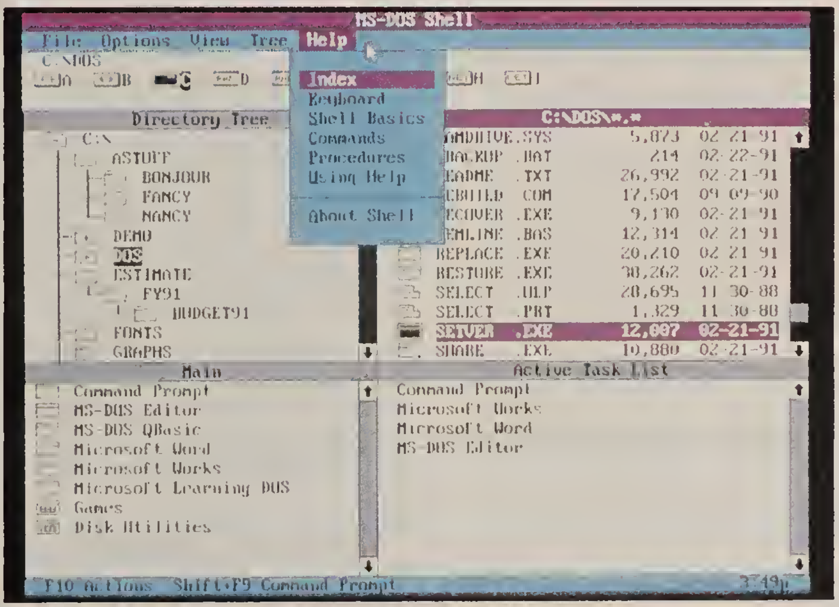
Despite Microsoft's attempts to make DOS 5.0 compatible with the wide range of software currently available for DOS, there are some conflicts with third-party disk partitioning software and device drivers.

Eric Rintell, vice president of Purchase Ltd. in New York, said he ran into a problem with Ontrack Computer Systems, Inc.'s Disk Manager on some Advanced Logic Research, Inc. and AST Research, Inc. systems. Fortunately, he said, Microsoft distributed many replacement software drivers with the upgrade package, saving him from having to contact the original manufacturer for an update.

Also, users of Logitech, Inc.'s mouse will need to have Version 5.01 or later of the mouse driver software. Microsoft mouse users will need driver Version 6.21 or later. Some systems will also require that software switches be used with the new HIMEM.SYS driver.

Microsoft supplies README.TXT and APPNOTES.TXT files, which detail incompatibilities and document solutions for many of them. Checking the files could save time on the 90-day free support lines.

Users can also get information specific to their systems by using the GO MSDOS command on Compuserve.



```
C:\
  ASTUFF
    BONJOUR
    FANCY
    NANCY
  DEMO
  DOS
  ESTIMATE
    FY91
      BUDGET91
  FONTS
  GRAPHS
```

```
AMDRIVE.SYS     5,873  02-21-91
ACKUP   .BAT      214  02-22-91
EADME   .TXT   26,992  02-21-91
EBUILD  .COM   17,504  09-09-90
ECOVER  .EXE    9,130  02-21-91
EMLINE  .BAS   12,314  02-21-91
REPLACE .EXE   20,210  02-21-91
RESTORE .EXE   38,262  02-21-91
SELECT  .DLP   28,695  11-30-88
SELECT  .PRT    1,329  11-30-88
SETVER  .EXE   12,007  02-21-91
SHARE   .EXE   10,880  02-21-91
```

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Command Prompt
MS-DOS Editor
MS-DOS QBasic
Microsoft Word
Microsoft Works
Microsoft Learning DOS
Games
Disk Utilities
```

```
Command Prompt
Microsoft Works
Microsoft Word
MS-DOS Editor
```

Among MS-DOS 5.0's *features is an enhanced DOS shell*

DOS upgrade

FROM PAGE 1

DOS 4.0, Windows 3.0 and OS/2 2.1 upgrades. There is also a conviction among OS/2 2.0 advocates that a DOS 5.0 upgrade would be redundant given OS/2's anticipated features.

Some would-be users of IBM's OS/2 2.0 have put the brakes on DOS 5.0 migrations. Two such users, Montreal-based Royal Bank of Canada and Price Waterhouse in New York, are waiting to see if IBM delivers on its OS/2 2.0 promises.

According to George Oliver, manager of information delivery technology at Royal Bank, there is no need to upgrade his DOS users because OS/2 2.0 with its multiple virtual DOS machines will provide him with the same and more advantages.

Sites that use IBM's OS/2 LAN Server said they will probably opt for IBM's DOS 5.0 version. LAN Server requires a specific driver for each version of DOS, said Ron Adinolfi, vice president of network information services at Swiss Bank. Brad Chase, DOS product-line manager at Microsoft, said Microsoft has worked a way around that problem. Adinolfi, meanwhile, is trying to find out if IBM will match Microsoft's 100% upgrade program.

John Guyer, director of systems at Financial Guaranty Insurance Co., recently downsized his business to a Novell, Inc. Netware-based PC network. He is having a problem getting his Netware drivers to run in the upper memory block of DOS 5.0, and until that and a few other network snags are resolved, he will not upgrade his 175 users.

Other users, such as Bob Holmes, a senior computing analyst at Southern California Gas Co., fall somewhere in between. Holmes, who claimed DOS 5.0 "is even better than Microsoft says it is," nonetheless plans to continue testing for a little while longer to avoid any "gotchas."

DOS 5.0 does have its enthusiasts. Several users reported waiting in lines last week to purchase upgrades.

The product is widely touted for boosting speed, easing memory constraints and simplifying installation, in part by eliminating the need for the clumsy Edlin text editor. Other attributes include a DOS shell, task-switching and context-sensitive Help (see story at left).

Some enthusiasts, such as New York Life, Ortho Pharmaceuticals and Swiss Bank, will engage in massive upgrade programs. Victor Mutnick, a corporate vice president at New York Life, said the easy thing is deciding to go with DOS 5.0. The hard part, he added, is getting it done smoothly.

Early feedback indicates that a greater percentage of users will purchase Microsoft's upgrade ($99) than will purchase IBM's ($85) because Microsoft's will work with multiple brands of PCs. And the bigger the account, the more likely it is to be negotiating a volume purchase deal with Microsoft.

Pacific Gas & Electric Co. in San Francisco, for example, hopes to upgrade all 18,000 of its PCs to DOS 5.0 during the next three years and said it wants to hammer out a purchase plan that covers the installation. Microsoft's 100% upgrade program for large sites prices DOS 5.0 as low as $37 per unit.

Elsewhere, DOS can be had for approximately $50 in many retail outlets, dropping as low as $39.95 at Egghead Discount Software and $29.50 at one East Coast reseller.

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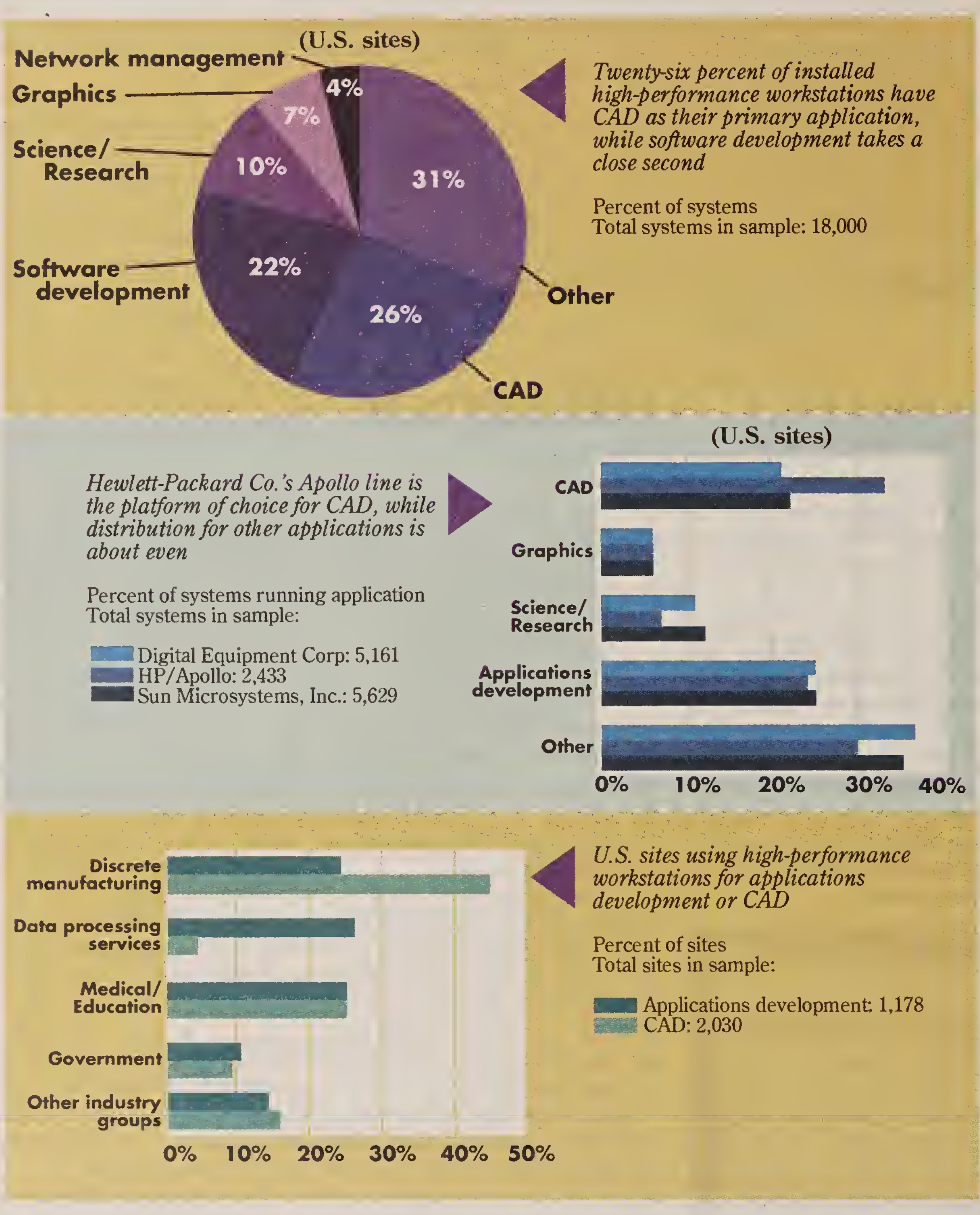
TRENDS

High-performance workstation applications

Workstations move away from more traditional roles and into the mainstream as the availability of applications increases



Twenty-six percent of installed high-performance workstations have CAD as their primary application, while software development takes a close second

Percent of systems
Total systems in sample: 18,000

Hewlett-Packard Co.'s Apollo line is the platform of choice for CAD, while distribution for other applications is about even

Percent of systems running application
Total systems in sample:

Digital Equipment Corp: 5,161
HP/Apollo: 2,433
Sun Microsystems, Inc.: 5,629

U.S. sites using high-performance workstations for applications development or CAD

Percent of sites
Total sites in sample:

Applications development: 1,178
CAD: 2,030

Source: Computer Intelligence, La Jolla, Calif.

CW Chart: Janell Genovese

NEXT WEEK

Through an IBM-sponsored program called Writing to Read, young children are using personal computers to read and write more effectively. The program was a finalist in the **Third Annual *Computerworld* Smithsonian Awards**, which honor technology applications that have benefited society. Ten of the finalists will appear in In Depth.

Du Pont Co., an information systems leader in many areas, is attempting to step out front on open systems implementation. Although still in its formative stages, Du Pont's Open Systems Program Office is expected to play a leading role in making seamless data sharing an integral part of the $40 billion firm's global strategy. See Manager's Journal.

INSIDE LINES

Cold shoulder

▶ Although Intel says things are still cool, the maker of a device that chills Intel I486 33-MHz chips to boost their performance is not so sure. A source at Velox Computer Technology, Inc., developer of Icecap, says Intel may sue to stop Velox from selling a board with an Icecap-equipped 33-MHz I486 chip as a 50-MHz board. Cooling the chip pushes clock speed to about 50 MHz but violates Intel warranties. Intel people say there are no plans to sue, but Velox says Intel has indicated that the Icecap board would compete directly with its chips.

Just when the Dodgers start winning . . .

▶ The steady relocation of many Ashton-Tate employees from their Los Angeles-area headquarters north to the Silicon Valley area has some industry watchers speculating that a full-fledged corporate move could be in the works. In recent months, the trek has been made by President Dave Proctor, Marketing Vice President Max Toy and dozens of sales and marketing reps. Chief Executive Officer Bill Lyons has never moved his family or primary residence out of northern Palo Alto, Calif.

Go figure

▶ Rumors are surfacing that Apple will use software from Foster City, Calif.-based Go Corp. to develop a pen-based computer that recognizes handwriting. Apple is now working on three notebook computers, at least one of which is expected to include handwriting-recognition capabilities. Go also enjoys tight links with Apple: William Campbell, Go president, is a former Apple executive who once ran Apple software subsidiary Claris Corp.

Poqet change

▶ Poqet Computer watchers who wonder what happened to an expected spring product announcement can wait till next year, according to one former Poqeteer. New CEO Robb Willmot has wrought big changes at the once fast-growing company, including killing as many as seven new products. Willmot has also replaced a number of vice presidents, and Poqet's personnel count has dropped from 200 to approximately 90 employees.

Addressee known

▶ Hewlett-Packard's electronic mail cohort, Uniplex Integration Systems, Inc., let slip an announcement slated for July 8 that it has ported HP's Openmail E-mail system to the IBM RISC System/6000 and DEC Decstation 5000 Model 100. HP Openmail is a mail server that provides an Open Systems Interconnect X.400 standard-based mail service.

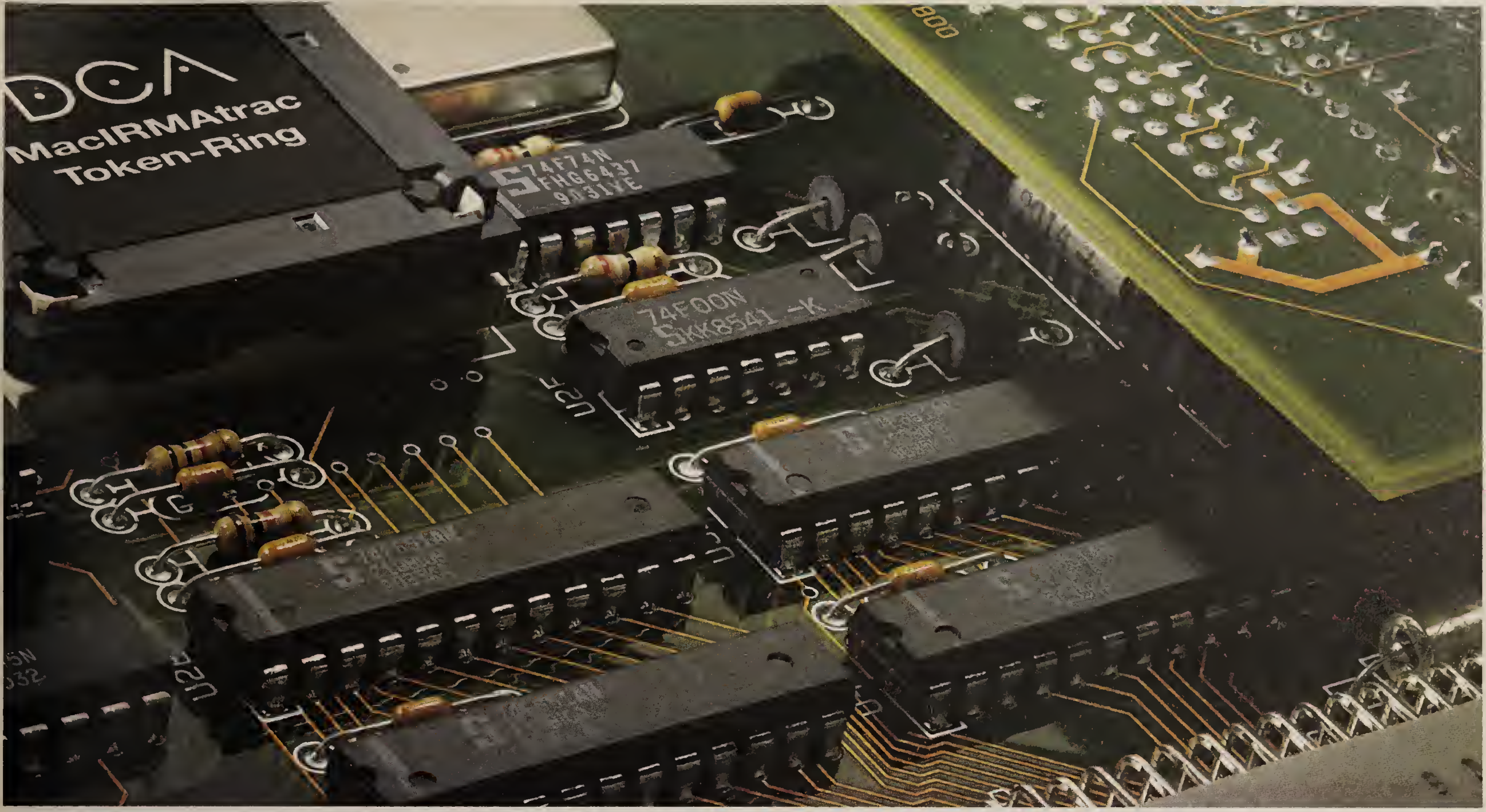
Do *they* know what the 33 means?

▶ Data General has been quietly demonstrating a new 33-MHz, dual-processor Aviion system workstation at various industry conferences during the past few months. The workstation turns in more than 60 million instructions per second. Reportedly code-named Rolling Rock, it is said to have high I/O capacity and is aimed at number-crunching workstation-based applications.

Bowling a few frames

▶ When IBM told *Computerworld* in April that "the industry wouldn't have to wait for the cold weather" for an IBM frame-relay interface announcement, it was apparently giving itself plenty of elbow room. Water cooler chatter among analysts has it that the announcement will be made tomorrow and that the initial interface will run on the vendor's 3745 Establishment Controller. IBM is rumored to have teamed up with fast-packet pioneer Stratacom on the project.

▶ *What do you think Apple and IBM are talking about? No one's saying for sure, but that hasn't kept the business press from amassing the biggest batch of speculation and anonymous quotations we've seen since Gary Hart pulled out of the political race. We're not proud. Find a home for your juiciest Apple-IBM rumors with News Editor Pete Bartolik at telephone (800) 343-6474, fax (508) 875-8931 or Compuserve 76537,2413.*



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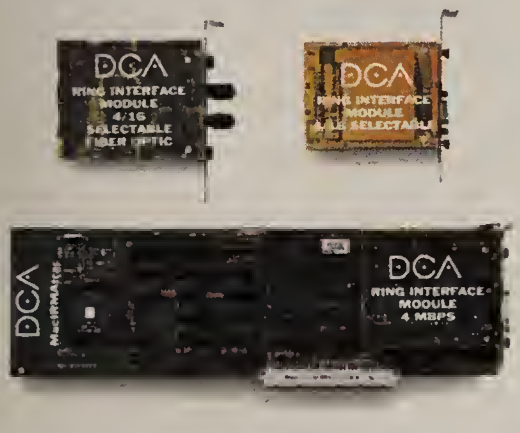
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